N.A.C.A.
BULLETIN

IN TWO SECTIONS • SECTION ONE

SEPTEMBER

1949

National Association of Cost Accountants

385 MADISON AVENUE, NEW YORK 17, N. Y.

IN THIS ISSUE

PAGE

Net Profit Analyses for Profit Betterment, by *W. A. Hensel*.. 5

Coordinating Purchase and Use Factors in the Stocking of Raw Materials, by *Norman E. Rieger* 13

"Extra Work Voucher" System for Disclosure and Control of Labor Variances, by *Robert T. McGeorge* 23

Two Compact Forms for the Measurement of Operating Performance Under Standard Costs, by *Norman A. Coan* 33

An Economical Payroll System Featuring Centralized Processing of Employee Deductions by Machine Methods, by *D. Phillip Beaudry, Jr.* 43

A Detail-Posted General Ledger Through the Use of Tabulating Equipment, by *Stanley G. Wall*..... 59

Putting the Factory Ledger on Punched Cards, by *Clarence J. Nelson* 67

Accounts Maintained for a Company-Operated In-Plant Food Service, by *Kenneth C. Pippert* 77

Meeting Management Cost Problems for a Publisher of Classroom Periodicals, by *John E. Shirley* 81

Shorts

Reduction of Material Handling Costs. *W. B. Castenholz, Jr.* 31

Calling Physical Inventory Into a Voice Recorder. *C. L. Fancher* 32

The Insurance Responsibilities of the Controller. *Horace S. Gordon* 57

The Cost Forum 91

Repackaging Slow Sizes — Centralization — Procedural Instructions—Interplant Comparisons—Capital Expenditure Forecast

This *Bulletin* is published monthly by the National Association of Cost Accountants, 385 Madison Ave., New York 17, N. Y. Subscription price, $10 per year. Entered at the Post Office, New York, N. Y., as second-class matter August 28, 1925, under the Act of March 3, 1879.

COPYRIGHT BY THE
NATIONAL ASSOCIATION OF
COST ACCOUNTANTS
September 1949

INTRODUCING THE MONTHLY N. A. C. A. BULLETIN

Change from semimonthly to monthly publication made in response to survey of members' preferences

---

With this issue the *N. A. C. A. Bulletin* becomes a monthly publication. As in the past, the *Bulletin* will be issued in sections. Section One will be devoted to articles and other technical material of lasting interest. Section Two will be given over to Association and chapter news and other items of more current interest. Additional sections will be utilized from time to time for research reports, annual reports of the president, and other matters which justify publication separate from the two regular sections.

The shift to monthly publication will be accompanied by some increase in the volume of technical matter published annually. Present plans call for a standard number of pages for each monthly issue. Section One will be 96 pages in length; Section Two will be 24 pages monthly. The resulting 120 pages per month or 1440 pages per year will represent an increase over the number of *Bulletin* pages published in each of the past two years.

The decision to change from a semimonthly to a monthly publication is the result of a survey of membership preferences made during the past year by the Committee on Publications, consisting of Warren J. Faust of Bridgeport, *Chairman,* Clarence B. Nickerson of Boston, and John Pugsley of Birmingham. The Committee prepared a list of questions relating to the form and contents of N. A. C. A. publications. These were presented for discussion and an indication of member preferences at chapter officer forums held in connection with regional conferences, at several chapter meetings, and at several chapter Board meetings. A broad cross-section of the membership was represented. The tests indicated that most members felt that the contents of the *Bulletin* were being spread over too many issues and sections. At the same time members expressed a preference for continuance of the sectionalized *Bulletin* which permits separation of the material of more lasting value from the current and news items. Following this showing of member preference the Executive Committee and National Board approved the recommendation of the Committee on Publications that the *N. A. C. A. Bulletin* be issued monthly with no change in the nature or reduction in the quantity or quality of the contents provided over a period of twelve months.

While no change in the character of the material published is contemplated, the combining in one monthly section of the articles, letters, and other technical items formerly published in three semimonthly sections will permit greater variety of contents and assure that every issue of the *Bulletin* will contain articles and shorter items of direct interest to each member.

ABOUT THE AUTHORS

W. A. HENSEL (Net Profit Analyses for Profit Betterment) is a member of the Controller's Staff, Statistician, and Tax Consultant with Ansco, Binghampton, N. Y., having joined his company in 1946. Mr. Hensel was Manager of the Tax Department of Bankers Trust Co., 1942-43, and earlier served as Assistant Comptroller, Gooderham Worts Ltd.

NORMAN E. RIEGER (Coordinating Purchase and Use Factors in the Stocking of Raw Materials) is Material Control Supervisor of the Grand Rapids Varnish Corp., Grand Rapids, Mich. Mr. Rieger has assisted in the design and installation of his company's material control and wage incentive systems and has occupied posts in the statistical department of the Walgreen Co. and of Western Electric Co.

ROBERT T. McGEORGE ("Extra Work Voucher" System for the Disclosure and Control of Labor Variances) is on the industrial accounting staff of the Ohio Injector Co., Wadsworth, Ohio, with which he has been connected for the past three years. Mr. McGeorge was formerly with B. F. Goodrich Co., becoming Office Manager of a branch manufacturing plant.

NORMAN A. COAN (Two Compact Forms for the Measurement of Operating Performance Under Standard Costs) is Manager, Sales Division Control Department, Marathon Corp., Menasha, Wis. Mr. Coan's business experience has included positions in the bakery, rubber, chemical, and metal container industries.

D. PHILLIP BEAUDRY, JR. (An Economical Payroll System Featuring Centralized Processing of Employee Deductions by Machine Methods) is Associate Professor of Economics at Birmingham-Southern College, Birmingham, Ala. A former contributor to the *Bulletin*, Professor Beaudry received his MBA degree from the University of Kansas in 1933 and his MA degree from Harvard in 1935.

STANLEY G. WALL (A Detail-Posted General Ledger Through the Use of Tabulating Equipment) is Chief Statistician, Minnesota & Ontario Paper Co., Minneapolis, Minn. Starting in a clerical capacity, Mr. Wall rose to his present position through successive promotions.

CLARENCE J. NELSON (Putting the Factory Ledger on Punched Cards) is Assistant Controller, New Holland Machine Division of the Sperry Corp., New Holland, Pa., and has been a member of the accounting staff of the division—and of the company prior to its affiliation with Sperry—since 1946. A veteran of World War II, Mr. Nelson is a Certified Public Accountant of Pennsylvania.

KENNETH C. PIPPERT (Accounts Maintained for a Company-Operated In-Plant Food Service) has been Controller of the Rock Island, Ill., Works of J. I. Case Co. and has been with the company at this location since 1940, since 1947 formerly occupying the posts of Assistant Chief Accountant and Chief Accountant.

JOHN E. SHIRLEY (Meeting Management Cost Problems for a Publisher of Classroom Periodicals) is a Partner in the firm of Arnold, Hawk & Cuthbertson, Certified Public Accountants, Dayton, Ohio, with whom he has been associated for the past six years. Mr. Shirley has had experience in the industrial as well as the public accounting field.

NET PROFIT ANALYSES FOR PROFIT BETTERMENT

by W. A. HENSEL,
Member of Controller's Staff, Ansco,
Binghamton, N. Y.

Advancing the belief that it is of real importance, particularly to top management and to sales management, to have available statements which seek to bridge the gap between gross and net profit for individual products (or lines, branches, customers, channels, etc.), the author of this article reviews the bases upon which assignments of the various categories of operating expenses —as distinguished from production costs—may be made. Emphasis is given to the assistance that such profit analyses may afford in inducing price, cost, or quality action to better the company's competitive situation.

EVERY accountant and business man is familiar with the term "net profit." Comparatively few are familiar with the calculation and significance of net profit contributed by specific phases, elements, or divisions of a business enterprise, i.e., each sales branch, territory, distribution channel, customer, product group, or product. However, more often than not the *extent* to which the given product line is sprinkled with items which are loss, from a net profit standpoint, is an unknown factor.

For the manufacturer, reasonably accurate calculations of the net profit realized on the sale of a given product in a diverse product line is a challenging problem. The lack of measurement factors or reliable standards emphasizes a sharp difference between the calculation of gross profit and net profit. Accordingly, it is the charges which must be assessed against gross profit which present the major problem. Generally speaking, the accepted tools for controlling and minimizing production costs are effectively utilized by executives in all well-managed business organizations. In the natural course of events, such tools provide individual product manufacturing costs which may be measured against sales price to produce a gross profit figure.

Problem Centers On Operating Expenses

On the other hand, the amounts of operating expense—such as distribution, selling, advertising and promotion, service, research and development, and administrative and general expenses—

which must be assessed against each product, are not made available in the same manner if at all. Operating expenses are accumulated functionally or objectively and, most often, controlled by means of a budget too frequently arrived at without reliable performance standards. Members of management compare actual expenses with the budget and strive for the reduction of various elements of expense which exceed it. This procedure is all right as far as it goes, but it provides no information as to the amount of net profit produced by a given product or operating element. Admittedly there are some types of operating expense which cannot be assigned to a given product with any degree of accuracy. Nevertheless, in the view which commends itself to us, this does not preclude the possibility of arriving at a net profit figure for products, which will be of value to management.

Generally, distribution costs account for a sizable portion of total operating expenses. With the proper procedure, the allocation of distribution costs to individual products can be accomplished with a satisfactory degree of accuracy. The same is true of advertising and promotion and research and development expenses. It is not true of administrative and general expenses. Here, an arbitrary allocation must be made on the basis of sales dollars, cost dollars, or gross profit dollars, whichever seems most reasonable. However, this arbitrary allocation of administrative and general expense in no wise detracts from the value of the results so long as the allocation is made consistently from period to period. The same arbitrary allocation is usually necessary in the case of certain elements of other income and other income charges. Under some circumstances, these may properly be omitted from the calculation.

Net Profit Analyses A Vital Concern of Sales Management

It may be well to visualize the uses of the statement for which we are striving. Assume for the moment that we have arrived at a statement of net profit by products which is satisfactorily accurate. It is the manner in which the statement is used by top management that is the significant factor. While such a statement should be of value to all members of management, it is to the sales executive that it is of the greatest significance. The production executive is concerned with costs which are recorded to arrive at a gross profit figure. Accordingly, he is not as vitally concerned with the charges which are assessed against gross

profit because, generally speaking, they represent items over which he has no control.

Sales management is usually concerned with increasing sales volume and staying within the expense budget. It does not seem to me that sales management should be too much concerned with the problem of keeping expenditures within the confines of a budget. More logically, they should be concerned with obtaining the greatest possible efficiency in distribution activities, so that total unit costs will be at a minimum and total net profits at a maximum. However, in order to accomplish this, analytical statements on a net profit basis are almost a necessity. These are the tools which will quickly bring to light such things as misdirected marketing effort; excessive distribution costs; unprofitable branches or sales territories; low profit products, product groups, or customers; unsatisfactory distribution channels; or inefficient sales personnel. When reliable information concerning these factors is available to management, then appropriate action is possible.

Of course, the matter of accuracy is a highly important one. It is likely that any management action taken to remedy the conditions above mentioned will be important and far-reaching. Accordingly, the information on which such actions are based must be accurate to as high a degree as possible. Some of the procedures which might be used to assess costs other than production costs, against individual products, product groups, branches, or territories, are hereafter briefly outlined.

Selling, Distribution, and Advertising and Promotion Expenses

The first of such operating costs mentioned was that of selling expense. For the average merchandising organization this represents, basically, a field force operation. Usually, the major elements of expense are salesmen's salaries and traveling expense. Both items are directly connected with salesmen's activities. Accordingly, it is on the basis of salesmen's activities that they must be distributed to individual products or territories or customers. Information with which to compile the basis for such distribution must be secured from salesmen's reports, submitted either daily or weekly. Such reports must be so designed that they convey the necessary information and so that their preparation is not burdensome to the salesmen. If possible, it is desirable to introduce such reports to the sales force as part of their weekly expense

reports or as an element of a commission or bonus plan. Clerical work is rough on a salesman's digestion unless it is a simple, fast operation or one from which he derives some direct benefit. The remaining selling and distribution expense elements must be considered individually and charged directly to the product, branch, or territory when there is a basis for such charge and allocated on a sales dollar or cost dollar basis when no other medium of distribution is available.

In the case of distribution expense, the main elements are salaries and wages, transportation costs, and shipping supplies. Frequently there is a warehousing operation involved with its attendant rental costs, depreciation charges on material handling equipment, and other charges directly connected with the warehousing operations. In general, these charges may be allocated on the basis of actual transportation costs. In the case of warehousing, the basis might well be individual product weight and cubic content. The same weight and cube base may be used in the allocation of warehousing labor. Local taxes and insurance costs may be applied to individual products on the basis of tax or insurable values. As in the case of selling expense, there are always residue items which must be arbitrarily allocated on a sales or cost dollar basis whichever seems most appropriate.

The results of advertising and promotion efforts manifest themselves in the form of advertising or promotional material. Accordingly, the distribution of this expense can be made on the basis of the products which benefit from the material produced. Each bit of advertising or promotional material must be analyzed to determine specific products or product groups which benefit. This analysis will disclose the fact that a portion of all material must be classified as institutional advertising. The portion of such material so classified must be allocated to products on a sales dollar or cost dollar basis.

Allocation of Other Operating Expenses

For all practical purposes, administrative and general expense must be allocated on an arbitrary basis, either on sales dollars or cost dollars or gross profit dollars. I am inclined to favor allocation on the basis of gross profit dollars on the theory that those products or branches which contribute the largest gross profit indicate the greatest administrative effort and, therefore, should bear the greatest share of administrative and general expenses.

There may be other distribution bases which can be suggested for this type of expense, but I am sure that they will all be more or less arbitrary and one will be no better than another.

Like advertising and promotion, research and development costs or expenditures may be considered in total and distributed on the basis of products or product groups which benefit from the research activities. In order to accomplish this, it is necessary to determine the amount of money spent on each research or development project and make the distribution on the basis of individual projects.

Other income and other income charges, in so far as they owe their existence to the regular business of the enterprise, should be distributed on the most practicable basis that can be determined. Discounts allowed can be distributed to products on the basis of sales dollars. Most likely, other elements will have to be distributed on the same basis with the possible exception of earned discounts which may be distributed on a cost dollar basis related to material costs. Other elements of miscellaneous income will have to be distributed on a sales dollar basis. Items which have their origin in functions or transactions outside the scope of the regular business of the organization may be omitted. The omission of such items will mean that the detailed net profit statement will not be in agreement with the corporate profit and loss statement. However, such agreement is not essential if the two statements are reconcilable.

Practical Accuracy in Allocation Obtainable

Admittedly the procedure which has been outlined embodies a lot of arbitrary expense allocation. That is the reason the final objective has been described, whenever reference has been made to it, as the production of *reasonably* accurate net profit statements. Over a period of time, experience will bring to light more accurate and acceptable distribution bases. Over a period of time also, a comparison of statements for various periods will prove extremely valuable in the disclosure of trends. I believe, that, were it possible to compile completely accurate net profit statements, the relationship that exists between one product and another, and one branch and another, or one customer and another, would be the same from a profit standpoint in the completely accurate statement as will be disclosed by the statement prepared on the basis just described.

Interpreting Net Profit Analyses for Profit Betterment

Interpretation is the next step in the program. After the statement on a net profit basis has been completed for products or territories or customers, the results must be interpreted. While, in the final analysis, the interpretation for purposes of action will be made by the member of management for whom the statement was prepared, it is the accountant's duty to prepare the initial or surface interpretation. The interpretation should be in narrative form, should be brief, and should serve to disclose the purpose of the statement immediately, point out the important facts, and catch the interest of the person using the statement. When you have awakened management interest and instilled sufficient confidence in your work to make statements the basis for management decisions, then you have started toward profit control.

Perhaps a more objective term would be profit betterment. You have brought home the point that the important and vital function of the business in each phase of its operation is to earn a net profit, a profit which remains after all charges have been paid and can be used to expand the business or increase working capital, or make distribution to owners in the form of dividends. With this information management is enabled to weigh, from an approximate net profit standpoint, how many and what kinds of customers to sell, what channels of distribution to use, what territories to cover, what products to sell and, with due consideration for competition, what price each product is to command.

Possible Management Actions in Terms of Effect on Net Profit

Every business enterprise services accounts which are unprofitable. In general, they are unprofitable because too much selling and promotional effort is given to a large number of small volume accounts. This does not mean that all small volume customers are unprofitable or that only small volume accounts may be unprofitable. Nor does it follow that all unprofitable customers should be eliminated. However, when the total marketing expenses or operating expenses and revenues of a business are analyzed, and the number and names of unprofitable customers are uncovered, management usually is enabled to reduce costs and often, at the same time, to increase sales volume substantially, by taking appropriate action to improve unprofitable accounts.

Whatever the management decision or whatever action is decided upon, the primary consideration should be its effect on net

profit. In the case of management decisions involving channels of distribution, due consideration must be given to the effect upon net profit as well as to the factors related to over-all sales volume, both actual and potential. Very often a reduction of costs or an increase of profits may be effected through careful examination of policies based on analyses of relative net profits by channels of distribution. Such an analysis may serve to disclose that it is desirable to transfer to dealers all small accounts which have proven to be unprofitable when served direct.

I do not mean to imply that a net profit analysis of the various things I have mentioned is the only management tool worth consideration. I do believe, however, that calculations implementing this analytical approach should be carried to the net profit point wherever possible. Neither do I mean to imply that the dropping of unprofitable items from the sales line or de-emphasizing sales activity in unprofitable territories or the dropping of unprofitable customers is the only method of converting losses into profits or increasing profits on low-profit factors. There are many other ways of accomplishing the same results. A few of the methods advocated by government economists who have made extensive studies in the field are these:

Simplify the line—Reduce the number of sizes, styles, and qualities in price lines. Simplifications may result not only in reducing storage, inventory financing, and order billing costs, but also in increasing sales by permitting concentration of advertising, selling, and styling and design on a smaller number of items. (This is not always feasible and may involve technological improvements of products in a standard line.)

Repackage or redesign the product—The change in the package may reduce the direct packing, transportation, storage, and handling costs. A new package or design may also influence the volume of sales.

Increase or decrease the amount of advertising and promotion work—Whether it will be profitable to increase or decrease advertising depends upon such factors as the effect of advertising on volume of sales and the effect of the volume of sales on unit production and distribution costs.

Decrease the price—Sometimes it may actually pay to reduce the price of unprofitable products. When consumer

demand is so elastic that a small reduction in price leads to a substantial increase in sales, the result may be a greater excess of dollar margin for distribution costs than the net contribution of the commodity at the old price. This may result from both an increase in the unit of order (with a reduction in cost) and an increase in total sales.

Increase the price—Where an *increase* in price may lead to only a small reduction in sales, it may be profitable to raise the price on unprofitable products in order to recover the loss on their sale. This would be true if the increase in dollar gross margin would exceed the increase in per unit cost of production and distribution that might result from the lower volume or the smaller unit orders.

Devise special routine for handling small orders—Minimize broken package sales by reducing the original package unit, by employing package units of several different sizes, or by developing special assortment packages for filling small orders.

Employ quantity discounts or increase or reschedule present quantity discounts with the size of the order—Quantity discounts must be in line with distribution costs differentials.

Net Profit Analyses Are in the Pioneering Stage

These are just a few of the generally known methods of achieving profit betterment. Effective remedies will vary with each business enterprise. Nevertheless, whatever the business and whatever the remedy utilized, the prime consideration in all instances should be the effect upon *net* profit.

I believe that the perfection and promotion of net profit analyses is at present in the pioneering stage. Certain phases of the concept are faced with the same problems and skepticism which confronted time and motion studies and many of the now generally accepted accounting principles when the latter were originally introduced. This is as it should be. It is a healthy condition that will unquestionably lead to a further improvement of accounting techniques in general.

COORDINATING PURCHASE AND USE FACTORS IN THE STOCKING OF RAW MATERIALS

by NORMAN E. RIEGER,
Material Control Supervisor, Grand Rapids Varnish Corp.,
Grand Rapids, Mich.

The operation of an organizational setup to control raw stock procurement and supply and featuring the coordination of the production and purchasing departments through the good offices of a material control supervisor, charged with alertness to such factors as price and availability in relationship to the need for materials, is described in this paper. The procedure followed and the material control card used as the key form in connection with it are presented in substantial detail.

THE controlling policy for the procurement of raw materials is determined in our company by a staff group made up of top executives and key personnel which actively discusses the problems pertinent to the situation as it exists currently and the prospects for the forseeable future. Decisions are reached as to minimum inventories of the various materials which shall be carried to cover our requirements, that is, whether we should carry a thirty-day, sixty-day, or ninety-day supply. In addition, the purchase of a major material item which may involve a considerable amount of money is discussed at the staff meeting, so that the final decision will be reached only after all departments affected have been able to present their views. Once a policy has been established, it remains firm until there is a considerable break in the market and it is deemed advisable to review the situation and possibly change our basis.

Material Control Supervisor a Coordinator

From the standpoint of executing policies established through the foregoing procedure we have our own home-made but still effective method to assure coordinated action. Because our line of products is so varied, it is difficult to forecast exactly what materials may be used and in what quantities. Constant watchfulness is needed. The purchasing department has its own problems. Many times it is necessary to order more material than is immediately necessary because of an anticipated market shortage or

MATERIAL CONTROL CARD (FACE)

1949

CODE NO. P-4 | NAME 5999 Carbon Black | MIN INVTY. 350# | NOTES Replaces P-5 which was discontinued on 9-29-47 Low-priced carbon black pigment.

	1947 1st & Max.	1947 Last & Min.	1948 1st & Max.	1948 Last & Min.	1949 1st & Max.	1949 Last & Min.
Av. Mo. Use	616#	369#	370#	321#		
Hi. Mo. Use	5-600#	8-450#	2-625#	8-400#		

	JAN.	FEB.	MAR.	APR.	MAY	JUNE
1st Invty.	425# 1/1	675# 2/2	350# 3/2	450# 3/30		
2nd Invty.	400 1/12	500 2/9	600 3/9			
3rd Invty.	750 1/19	475 2/16	750 3/16	450 4/13		
4th Invty.	700 1/26	400 2/23	550 3/23			
Disappearance	250#	375#	400#			
Use Data	219	337	421			
Expected Use	26#	19#	57#			
	74	64	86			
	19	35	201			
	14	107	95			
Receipts	500# 1/14		300# 3/3			
			200 3/10			

	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
1st Invty.						
2nd Invty.						

EXHIBIT 1

because it is cheaper to buy in carload, truck load, or tank car lots. At the same time the factory manager, who controls production planning and storage, has related but different problems. Therefore, it is necessary to coordinate the purchasing and producing activities as much as possible. We do this by establishing this coordination as a function and placing one man in control of it. He is called the material control supervisor.

Before a purchase order is made, it is necessary for the purchasing department to have a purchase requisition from the factory, initialed by the material control supervisor and signed by the factory manager. This places the final authority on most items with the factory manager. Of course, we still handle major purchases which may have a significant effect on our whole situation through the staff group, but the bulk of the purchasing is handled as described above. Occasionally there are items to be purchased on which agreement does not exist between purchasing and production control. This makes it exceptionally difficult for the person who is attempting to keep both departments informed.

Since our active inventory lists approximately 400 pigments, driers, rosins, gums, resins, oils, thinners, solvents, types of nitro-

cellulose, purchased solutions, miscellaneous compounds, aluminum and bronze pastes and powders, as well as various sizes and types of steel drums, small steel containers, tin cans, bottles, corrugated cartons and wooden shipping boxes, the complexity of the purchasing problem and the amount of detailed information required by the material control supervisor to satisfactorily maintain the inventory level of these items can be realized.

A Data Card for Material Control

To facilitate the conduct of the work, a material control card was designed, the face and reverse of which are shown in Exhibits 1 and 2, respectively. The card is 8" wide by 8½" high so that it will fit in a metal file tray of a size that can be used easily. It is printed on a good grade of stock since it is handled from at least once a week to several times weekly, depending upon how important to our operations the item is or how fast moving. Entries are made with a fairly hard lead pencil to avoid smearing. Related materials or items are grouped together.

Individual cards are made out for each of the 400 items at or before the beginning of the year. On the side shown in Exhibit 1, entries are made at this time down to the headings of the monthly columns except, of course, current year's usage data.

The information so entered includes the code designation, our company's short reference for a particular item. Each class of items such as thinners, pigments, solvents, etc., is identified by a different letter preceding the number portion of the item designation. In the example, "p" = pigment. P-4 is # 999 Carbon Black.

MATERIAL CONTROL CARD (REVERSE)

CODE NO. P-4 | WT. PER GAL. 14.6# | 1949 | ORDER AMOUNT 500# (Price-break) | DELIVERY TIME 1 week

MONTH	REQUISITION NO.	REQUISITION DATE	REQUISITION AMOUNT	ORDER NO.	ORDER DATE	SUPPLIER	SHPG. DATA	RECEIPTS AMOUNT	RECEIPTS DATE	RECEIPTS AMOUNT	RECEIPTS DATE
JAN.	3	1/6	500#	28929	1/7	Pigm. Matls.	P.O. 2/11 ship as once	500#	1/14		
FEB.											
MAR.	84	2/24	500#	29858	2/25	Pigm. Matls.	P.O. 2/1 Parts shipped	300#	3/3	200#	3/10
APR.											

EXHIBIT 2

Headings: Face of Card—Minimum Inventory and Use Data

The remainder of the preentered information leads into our use of the card. Under "Minimum Inventory" is entered the quantity below which management does not wish the inventory to drop. This may vary from a thirty-day all the way to a six-month inventory, depending upon the supply and price outlook. Although decisions regarding desired inventories of major groups of items are made by the staff, decisions upon most of the individual items within the group are made by the material control supervisor. Knotty items are decided upon by the purchasing agent and factory production manager with the material control supervisor acting as "go between." Serious differences of opinion concerning the quantity to be maintained on important items are referred to the general manager or put up to the staff for final decision. In a declining market the purchasing agent may want to hold off buying until the inventory is as low as safety will permit. The question of how far to go in this direction influences the size of the minimum inventory decided upon.

Under the heading of "notes," are put any helpful comments or memory joggers that may pertain to the material and help in its control. Such notes might read "used in # 1000 white house paint, 3 lbs. to the gallon" or "used in V-39, 250 lbs. per 300 gallon batch" or "obsolete—laboratory will specify how to work off." Other examples are "can stand outside storage in drums" and "must deliver in tank cars with steam coils October through March." Exhibit 1 shows still another example.

The average monthly use figure for the item for the specified six-month period is entered under the appropriate dates. These are computed for six-month periods rather than annual periods in an attempt to show seasonal influences upon our usage. Many of our items are used more heavily in the first six months of the year when the bulk of our home decorating items—such as interior finishes and exterior house paints and trim paints—are manufactured. This information can be very helpful in determining the quantity to order at any particular time since one can see at a glance what the average monthly consumption was during the corresponding period last year and the year before. The figures for the current year are computed and entered as the year moves along.

Opposite high month's use is entered the highest individual monthly usage during the six-month period. The month is denoted

by the small number preceding the dash before the use figure. The high month's use, taken together with the average monthly use figure, gives a very good indication of whether the quantity used fluctuates widely or remains fairly constant. In other words if the high monthly usage is considerably greater than the average monthly usage, the possibility of wide variation in usage is indicated. If the high month's usage and average monthly usage are quite close together, a fairly stable usage is indicated in most cases. In maintaining a thirty-day inventory for widely fluctuating items, it is safer to be guided by the high month's usage rather than by the average monthly usage.

Headings: Reverse of Card—Standard Order Amount

Preentries are also made on the reverse of the form as displayed in Exhibit 2. These comprise all information called for above the heavy line. Weight per gallon is needed for computing the number of gallons of various liquids (such as oils, solvents, or solutions) from the net weight of the material received against orders, as reported on the receiving report. The most economical quantity to be purchased is entered as the order amount. This may run all the way from one pound to a carload or from one gallon to a tank car. There is room for great difference of opinion on this figure since the purchasing department recommends the quantity for which the greatest saving in cost of the material and in transportation charges will be realized, while the factory manager is reluctant to tie up storage space or perhaps even working space with an excess quantity of a material. Often the purchasing agent has a chance to obtain surplus material at a price saving but, if it is a bulky item, there may not be storage space for it in the plant and it will have to be sent to a public warehouse where storage fees will be incurred. Also there is a constant desire on the part of the purchasing agent to realize the savings possible in buying in carload rather than less than carload lots, truck loads as against smaller quantities, and tank cars as against drums. The quantity to be entered here may have to be determined by conference or by reference to the staff group mentioned earlier.

The average length of time it takes for the material to come into the plant from the time the requisition is executed and forwarded to the purchasing department is entered as delivery time. This varies from a few minutes in the case of items handled by local supplier to several months in the case of scarce items.

Transaction Entries: Inventory and "Disappearance" Figures

It will have been observed that the heading data on both sides of the card call for decisions not always easy to make but desirable to have set down clearly when made. With these data entered, the material control card is ready for use. Our company has two physical inventories each year, one during the middle of the year and one as of the calendar year end. The latter inventory is entered opposite "first inventory" in the January column. It is the first transaction entry. In Exhibit 1 it appears as 425 pounds.

A weekly inventory is taken every Wednesday by the man in charge of material storage in the plant. This is a rough physical inventory that disregards part full drums and part full barrels of most items but is accurate enough to let us know our inventory position. Copies of this inventory go to the purchasing department, plant manager, material control supervisor, and the various foremen. These figures are entered opposite the second, third, and fourth inventories during the month as these dates occur, if entries are considered necessary. Opposite the first inventory of months after January is posted the inventory of the Wednesday nearest the first of the month, i.e., 675 pounds on February 2, 350 pounds on March 2, and 450 pounds on March 30, as shown on Exhibit 1.

It will be noted that provision is made for recording the disappearance of material from the first inventory of one month to the first inventory of the next. This is computed by adding to the first inventory the receipts for the month and subtracting from this total the first inventory of the next month. For January, in the illustration this would be 425 pounds plus 500 pounds minus 675 pounds equals 250 pounds. This is the amount that has been consumed or otherwise expended. Because of the fact that inventory is taken every Wednesday, the disappearance shown under most of the months will be for four weeks. Once every quarter it will be for five weeks. A small "five week's" notation in the disappearance line is a way of calling attention to this when it occurs.

Use and Expected Use

In the use data line of the form is entered the quantity of each material used for the calendar month as reported by the cost department in a monthly use report. These quantities are accumulated by the cost department from the batch or production sheets for each month. (A batch or production sheet is made for each batch of finished product scheduled to be manufactured and

on it are shown the code and amount of various materials required, manufacturing method to be followed, and dates of manufacture and approval.) Copies of the material use report go to the purchasing department and to the material control supervisor. It may seem inefficient to show both a disappearance and use figure, but the check that one provides against the other and the added confidence resulting from it have made it well worth the extra time taken in entering both sets of figures. It should be understood that the two sets of figures may differ in any given month, because of the different number of days on which each is based. However, the two sets should balance fairly closely by quarters.

In the expected use section of the material control card, there is entered weekly the amount of the material expected to be consumed out of the inventory posted above in the inventory section. In other words, if one is working with the first inventory in January, the amount of material expected to be used out of this inventory is entered on the first line under January in the expected use section. This is 26 pounds in the illustration in Exhibit 1. It should be mentioned that the expected use information is compiled only for certain departments and for certain types of products where the material requirements are apt to fluctuate widely from week to week. In our company, about 150 of the total of 400 active inventory items are of this nature. Any of these 150 materials included in current batch or production schedule sheets are recorded on work sheets each week on the day the inventory is taken. The totals from the work sheets are then posted in the expected use section on the line corresponding to the inventory date.

For the 250 items on which no expected usage is computed each week, current consumption is watched closely and current inventory, average past usage, and delivery time are correlated and an order placed so that material will arrive at approximately the time the minimum inventory is reached. Sudden, sharp increases or decreases in business, inability of suppliers to ship, and delays in transit will cause particular materials to run considerably above or below the minimum inventory at the time of delivery, but such occurrences can be minimized by constant vigilance.

Any large or unusual production program for which accurate information is available in advance can be broken down as to material requirements and posted in the expected use section for as many weeks ahead as schedule information is available. For

Purchase Requisition No. 3

Date 1/6/49

Purchasing Department
Please purchase the following named items:

INDICATE SOURCE OF SUPPLY IF KNOWN

Quantity	Number	Description
500#	P-4	Please ship at once.

Purpose or use

When wanted

To be filled in by Purchasing Dept.
Date ordered _____ Order No. _____
From

For _____ Dept.

N.E.R. (Matl. Control Supv.)
Approved J. C. Smith (production manager)

EXHIBIT 3

example, if ten drums of a particular finished material are to be shipped each week for the next three months, the raw materials required each week can be determined and posted at one time in the expected use section by weeks for the entire period.

The receipts section is the last one on the face of the form and serves for posting of the quantities of the material received, with dates. These data are entered on the line corresponding to the period covered by the weekly inventory to which it is an addition.

Detailed Requisition and Receipt Record

The entry lines and columns on the reverse side of the form are provided for keeping track of the material requisitioned by the material control supervisor, the order placed by the purchasing department, and the receipts of material against the order. The columnar headings are self-explanatory with the exception of that relating to shipping data. In the upper half of the line under this heading is put the desired shipping date requested on the requisition. Exhibit 3 shows a requisition for which posting is displayed in Exhibit 2. There the letters "A.O." represent the "at once" request for shipment as soon as the supplier can conveniently make it. Similarly "R.A.P." for "rush all possible" requests the supplier to do everything he can to expedite delivery including special shipping arrangements if necessary. "P.R." for "please rush" requests the supplier to place the order ahead of "at once orders." In the lower half of the shipping data line is entered any follow-

up information secured by calling the purchasing department regarding the particular order.

It will be noted that the receipts section has two amount and date columns. These are provided in case the supplier part-ships against our order as he did in March, as the entries given indicate.

Factory Supplies

There are a number of miscellaneous items in the category of factory supplies that are not inventoried weekly in our plant. The departments using these items request the material control supervisor to requisition them when the supply runs low. Among these supplies are tin and carton adhesives, gummed tape, putty knives, laboratory brushes, batch sheets, marking crayons, chalk, gloves identification tags and many others of the same general sort. Requisition and order information for these are recorded on a material control card for the group as a whole. This card is labeled factory supplies and only the side shown in Exhibit 2 is used. The first requisition and order for factory supplies are entered on the first line of the card. The next requisition and order are entered on the line following. In other words, the month column is disregarded and requisitions and orders for factory supplies are entered in simple chronological order. In the column used for shipping data in respect of regular materials, the name or a description of the supply article ordered is shown and it may extend into the first amount and date columns under receipts. The second amount and date columns for receipts are considered sufficient in the case of supply items, as partial shipments are infrequent. In this way a record of many miscellaneous items can be maintained on a very few cards.

Control of Four Hundred Active Items

The system described in this paper has worked very well in our particular business in providing proper supply of some 400 active items (of which, as has been indicated, 150 items show a fluctuating activity which calls for special control consideration), as well as some 75 miscellaneous factory supply items. The system is operated by a personnel of one. It is clear—and it might be thought a weakness—that our system does not assemble precise quantities of materials to be used in a succeeding week or weeks and that expected use data developed is limited to certain items. However, the majority of our executives feel that analyzing all incoming or-

ders for the raw materials required and posting the results to summary sheets and then to the control cards would require too much clerical work and expense for the value derived, because we have many rush orders and the bulk of the orders from customers would call for shipment before the raw materials could be procured for them under such a procedure.

Therefore we rely upon past average consumption, weekly inventories, and any readily available probable usage information for inventory control. If the factory manager, foremen, lead men, inventory man and material truckers can be alerted to report any unusual movement or pending shortage of materials, the system is just that much more flexible and valuable. It might be mentioned that the card records also afford a very valuable and convenient source of statistics for management's use. Total usage, average usage, purchased amounts, sources of supply, arrival dates, and length of delivery time are available immediately by reference to the card for any material. This frequently furnishes the basic information for a quick answer when there is a sudden market break on a large volume item. This is the most expedient method of control that we have been able to devise to date.

"EXTRA WORK VOUCHER" SYSTEM FOR DISCLOSURE AND CONTROL OF LABOR VARIANCES

by ROBERT T. McGEORGE,
Industrial Accountant, Ohio Injector Co.,
Wadsworth, Ohio.

Determination of a labor variance amount is a starting point. This paper offers a description of the methods, based on an "extra work voucher" system, through which one company isolates labor variance factors. In this direction, nine causes are noted for the payment of compensation at rates over standard.

AMONG the most fertile fields for possible cost reduction is that of the uncovering and control of labor variances. To isolate labor variances, an unusual technique has been developed in our organization which has the advantage of furnishing this information quickly, to the point, and at a low cost. This is known as the "extra work voucher" system.

Before embarking upon explanation of our procedure for bringing labor variances to the surface by cause, it may be helpful to indicate some of the most common factors which contribute to labor variances:

1. When piecework rates have been established
   a. Reporting of excess production.
   b. A higher rate paid than the standard due to deviation from standard practice.
   c. Payment of daywork although piecework is established, due to insufficient quantity produced to enable operator to earn the piecework rate.
2. When daywork rates are applicable
   a. Excess of actual time over estimated standard time.
   b. Payment of daywork due to piecework rates not being applicable to the method or condition of material.
   c. Extra operations not provided in the standard method.

The "extra work voucher" system enables these causes of labor variance to be brought to light, except variance due to incorrect reporting of production. Separate mention of this cause is made later in the article. Necessarily, the system reflects our particular

operating situation and a brief description of our product, production scheduling, and time card procedure is in order.

Company's Product and Manufacturing Processes

We manufacture valves. A valve may be defined as a device to control the flow of a fluid. It has four principal parts—body, bonnet, stem, and wedge—as well as lesser parts such as the wheel, nuts, bolts, glands, etc. The body is the main part through which the fluid passes. The bonnet fits on top of the body to prevent the material from overflowing from the body as well as to act as a support for the stem. The stem is the means by which the wedge is raised or lowered and extends from inside of the body through the bonnet to the outside of the valve. The wedge fits vertically in the body and, when lowered, stops the flow of the fluid.

Most of the parts pass through three major types of operations in the course of their manufacture:

1. Foundry—castings to form the general shape.
2. Machining—to obtain exact dimensions and thread.
3. Assembly—fitting together of necessary parts and testing.

Foundry and machining operations are further broken down to:

Foundry	*Machining*
Core making	Machine bonnet end
Molding	Machine pipe end
Melting	Thread pipe end
Cleaning	Bore water way
	Face seats
	Drill flanges

Master Deck of Parts and Operations Cards

The first step in our plan of production scheduling and labor accounting is the preparation of a master deck of punched cards. A master deck for any given valve consists of a control card for each part—whether major or minor—as listed in the engineering specifications and an operation card for each operation set forth in the standard method of routing. As assembled in the master deck for each valve, each part control card is immediately followed by the necessary operation cards and each part card and operation card indicates the valve number in which it is used, part number, and quantity of parts required to produce one valve. The operation card is designed to serve as a combination time card and job dispatch ticket. Each operation card has prepunched in it part num-

ber, valve number in which it is used, quantity of parts required to make one valve, operation number, machine on which the operation will be performed, piecework rate for the operation, and charge department and account number. As the operation card will also be used as the employee's time card, the payroll number is recorded on the card when the operator becomes known.

Reproducing Cards for Valves Scheduled for Production

When the production schedule has been released by the planning department, a punched card is prepared with the plan number, desired valve, and quantity for each plan or lot. The master decks for the scheduled valves are removed from the file and reproduced. (The master decks are subsequently returned to file and all work is handled by use of the duplicated decks.) In each group of cards representing one valve, the quantity of valves to be produced is punched in each part card and operation card by a machine designed for this purpose. An electric punched card multiplier determines the total number of parts required by multiplying the quantity of valves to be produced by the quantity of parts to produce one valve. This extension is punched in each part card and operation card. The punched cards are then interpreted in order that those using the cards can read from printed instructions on the cards, resulting from the interpretation process. (The term "interpretation" refers to the operation of printing across the top of the card the information which is punched in the card.)

After the cards have been extended and interpreted, they are sorted by part number to combine all of the common items. By use of an electric accounting machine, a report is prepared to enable the planning department to know the total quantity of parts by part number to be scheduled or purchased from vendors, as they are required for each production schedule. The report and interpreted cards are now ready for use.

Use of Operation Cards by Dispatcher, Worker, and Timekeeper

When the planning department is ready to release the manufacturing authorization for any production schedule, the dispatchers on the floors are given the operation cards and issue them to individual employees as each job is to be run.

Each employee hands his operation card to the timekeeper who records the starting time and the employee's clock number. At this time the operator inspects the card to determine whether the

conditions under which the job is to be run agree with the information shown on the card. If the conditions are identical and the employee agrees that the rate is correct, he begins the job. At the completion of the job, the employee reports to the timekeeper the number of pieces he has machined. The timekeeper calculates the elapsed time and records it as well as quantity produced.

Origins of "Extra Work Vouchers"—Types of Variances

Labor Variances Resulting from Higher Rates—If, at the time that the dispatcher activates the job, the employee feels that, due to momentary conditions, the rate for the job does not agree with that shown on the operation card, he will report to his foreman and request an "extra work voucher." This condition refers to cause b.—mentioned at the start of this paper—under both piecework and daywork arrangements, i.e. payment of a higher rate than standard or payment of daywork due to piecework not being applicable.

The foreman determines whether the employee is entitled to extra compensation and, if so, issues an "extra work voucher" on which is indicated the reason among the following possibilities:

1. Requirements of production scheduling department
2. Supervision fault
3. Defective material
4. Defective workmanship
5. Defective equipment
6. Planning department errors
7. Vendor's fault
8. Engineering department fault
9. Miscellaneous

This is the beginning of the control of labor variance due to payment of a rate higher than the standard method or the payment of daywork instead of piecework. The "extra work voucher" is issued for the difference between the standard cost and the total for the job under the operating conditions obtaining. In order that the foreman need not make the computation of the difference, the new rate for the job is simply entered in the appropriate space on the "extra work voucher." The timekeeper enters the standard rate also and calculates on the face of the card the labor variance per unit of work. As the employee's total earnings will be the sum of the amount on the standard operation card plus the amount of the extra compensation, the "extra work voucher" will accompany the standard time card and, in effect, be made a part of it for pay purposes.

The payroll department, upon receipt of the time cards, will extend both the original operation card and the "extra labor voucher cards" by the quantity produced times the piecework rate in order to determine the employee's earnings. The original operation card will represent the standard amount of labor which will be charged to the inventory. The "extra work voucher" card will represent the amount to be charged to labor variance. Any information written on the "extra work voucher" which the foreman issues to the employee will be key punched upon arrival in the tabulating department.

Failure to Earn Guarantee—Payment of higher rates and the issuance of a special card, as described, is by no means the only form in which "extra work vouchers" originate. There are also vouchers resulting from other types of variance causes. With respect to failure of operators to earn the guaranteed rate, the first thing each day the time study department representative and the foreman review the time cards together. If an employee has produced an insufficient quantity and has failed to earn more than the minimum guaranteed earnings, the condition is investigated. In the event that the time study man and the foreman agree that the low earnings are due to conditions beyond the control of the operator, they will indicate on the face of the card the specific daywork rate which shall be paid. The payroll department determines the excess amount of labor cost due to paying the employee a minimum guarantee. A separate punched card is prepared for the excess cost and represents an "extra work voucher."

The excess cost in this case is classified as failure to earn guarantee. It is variance cause 1.c. in the summary at the start of this article. This type of expense is set out separately in the excess cost section of the manufacturing statements. Thus management will be provided with information which will enable steps to be taken to eliminate this cause for extra labor costs.

Labor Variances Due to Payment of Daywork—The payroll department, itself, prepares the excess labor card for the labor loss due to payment of daywork on operations for which piecework rates are established. This includes a card for the extra amount required by the approval notation on failure to earn guarantee as well as payment of daywork on piecework jobs for other reasons. The payroll department likewise prepares an excess labor card for the excess of actual time over estimated standard time.

This is item 2.a. on our original summary. If the amount of the standard direct labor has not been punched in the operation cards, the information can be obtained from the cost department. The excess labor cards so prepared are "extra work vouchers."

Extra Operations Causing Labor Variances—This category of variance corresponds to the 2.c. notation on the first page of this paper. Blank time cards are supplied the timekeepers to provide for the extra operations which are not included in the standard cost. The timekeeper writes on the blank time card all the information which is normally prepunched, such as part number, operation number, necessity of the operation, etc.

With notation as to necessity of the operation appearing on the card, it will not be necessary to rely on the foreman's memory for the reason for the extra operation when the "extra work vouchers" are analyzed. It should be determined whether this operation can be eliminated in future schedules. However, if conditions have changed which dictate that this operation will always be necessary, then the standard costs should be revised.

Summary of Vouchers; Circulation of Variance Report

When the "extra work vouchers" are analyzed, it will be necessary to have complete information concerning the job to which each applies. To obtain this information, the common information such as operator's number, part number, machine number, and operation number are transferred from the original operation card to the "extra work voucher." This will be done in the tabulating department by use of electric equipment.

At the end of the specified time for which analysis of the labor variance is to be made, the "extra work vouchers" are sorted out and a report prepared showing the excess labor costs by the several causes which the vouchers plainly indicate. This report is delivered to the foreman for his review accompanied by the vouchers. The foreman enters his comments on the report and the cards are returned to the office for accounting distribution. The total of the month's accumulation of "extra work vouchers" must agree with the total direct labor variance on the manufacturing statements. This variance is then distributed to product lines on the profit and loss report.

The variance report, itself, is passed on first to the factory superintendent to give him an opportunity to reduce the excess costs.

It is then sent to the controller to determine whether or not progress is being made by the factory toward the goal of reducing costs. The report also provides the controller with information to be included in his monthly report to management.

A Basis for Action

The analysis of the excess cost—the variance report—which has been made possible by the "extra work vouchers," is useful to management as a tool to know what steps to take to reduce the costs. In a majority of cases, the fundamental causes will be

1. Requirements of production scheduling department.
2. Defective equipment.
3. Defective material (hard castings).

Labor losses due to the first cause will indicate to management that inefficient or obsolete equipment is being used in order to produce in sufficient quantities to meet shipping dates. The amount of labor loss due to production scheduling requirements is readily available to compare with the cost of new and more efficient equipment, to assist management in machine purchase decisions.

Disclosure of the other two causes mentioned is also helpful. If a considerable amount of labor loss is due to equipment needing repair or out-and-out replacement, the management can weigh the cost of such repairs (or replacement) with the amount of labor loss. When the factory superintendent has information concerning the extent of the loss due to defective material, he is in a position to point out the seriousness of the situation to the metallurgist and the foundry foreman. It may be that the specifications are not being met or that specifications are in error.

Control of Operator's Production Count

We come now to a variance cause not disclosed by the issuance of "extra work vouchers." In a foundry operation, it is not possible to produce the exact number of castings required. Accordingly, it is the general practice to include a loss factor in the foundry production schedule. If the requisition for castings to be delivered to the machining department indicates 2,000 pieces are wanted but there are 2,100 pieces in rough stores, it may be more economical to machine the 2,100 and retain the excess quantity in finished parts stores. As the operator on the first operation may actually produce 2,100 pieces, although the production order speci-

fies 2,000, the timekeeper is not in a position to question the employee's count. In order to check on quantities employees are reporting, a summary is made at the completion of the job.

A report is prepared, by part number, of the quantity of pieces actually furnished by the rough stores, the quantity paid for on each operation as reported by each operator, and the quantity delivered to finished stores. If the quantity paid for increases on subsequent operations, it indicates that either the operator has overstated his production or he has performed rework operations which are not properly classified. If the same employee continually shows an excess quantity, detailed checks will be made when this employee reports his daily production.

The Foreman's Part in "Extra Work" Control

In any installation of the "extra work voucher" system, the foremen will probably feel that, by placing the burden of the issuance of a substantial portion of the extra labor vouchers (and approval of others) on their shoulders, the result will be a considerable demand on their time for this function. However, if the foremen are, in this way, made more conscious of the excess costs involved, they will spend more time in correcting adverse situations before substantial variance occurs. In so doing, they will also be reducing the number of these vouchers. Likewise, the foremen will spend less time explaining the reasons for the excesses after the reports are issued. Most important is the fact that the foremen will have information to assist them to do a better job as cost control representatives of management.

A Welcome Source of Specific Information

Perhaps the majority of organizations have labor variances which increase the cost of production. However, only a few of them have enough knowledge of such expenses to enable them to eliminate or control them. It has been found that, through the use of the "extra work voucher" system, a control of these variances is quickly available and at a very low cost. The issuance of a separate card for the amount of the extra labor costs functions as a signal to call attention when these costs arise, and is always quickly available for analysis.

Reduction of Material Handling Costs

Management tends to overlook the fact that, in many cases, material handling costs are buried under the heading of direct labor. It is obviously impossible for timekeeping to police and account for every minute of direct labor. All too often, the productive worker handles materials either in bringing them to his work station or in delivering them to the next operation, which time is included in his productive time for the day. Thus a large amount of material handling cost is never set out as such.

Too often the cost accountant looks at the item of material handling costs in comparison with the amount budgeted for it, pats himself on the back if the costs do not exceed the budget, and promptly proceeds to forget about the matter. It would appear that the cost accountant should enlist the aid of the industrial engineer to unearth the real costs of material handling and it should be his responsibility to point out these costs to management. Obviously, he is not in a position to solve this problem on his own.

There are, of course, many ways to handle materials. As it has often been said, the cheapest way is not to handle them at all. More economical material handling can be achieved by a close scrutiny of all direct labor operations in order either to eliminate unnecessary handling or to substitute mechanical means of moving materials. The latter solution is particularly important today since labor costs are at high levels. The entire layout of the plant also plays an important part in its effect on the reduction of material handling costs.

The location of the receiving department units and the store rooms is just as vital as an efficient layout of the producing departments. Unfortunately, in many cases, the plant structure was never properly designed for an efficient manufacturing operation. Paradoxically speaking, this is fortunate where conveying equipment can be installed as it makes little or no difference whether material is brought by a roundabout way from, say, raw materials stores to a production department, or whether it goes directly. Also, in many instances, the force of gravity can be utilized in order to transfer materials from upper floors to lower.

The industrial engineer, with the assistance (usually) of those who sell material handling equipment, should be able to evaluate the various factors involved in the material handling problem. Such factors take into account the nature and weight of the product, the distance between manufacturing operations, the frequency and quantities of material to be moved, and the available storage areas. Application of these factors to the particular problem will result not only in eliminating much of the overhead costs labeled material handling, but will also result in a saving in direct labor through expediting the flow of work and through greater use of the available time of the productive worker. In addition, storage requirements, breakage, and spoilage may also be reduced.

Against gross savings so realized, there are, of course, offsetting costs arising from the purchase of new equipment and its subsequent maintenance.

Contributed by W. B. CASTENHOLZ, JR., *Hartford Chapter*

Calling Physical Inventory Into a Voice Recorder

The idea of using a recording device for inventory taking was conceived approximately ten years ago by a large grocery chain operator who desired a quicker and more efficient method than the one he had been using. Practice, at that time, was to check inventory by one of two manual methods:

1. *Two man teams—one caller and one writer.* The caller would "sound off" the price and quantity of each article and the writer would list the information on a form sheet.
2. *Individual count.* The counter would carry with him a clip board and preprinted forms and, after making his count, list the articles himself.

In either case the information gathered would be computed by machine and posted by clerks at the home office. However, the manual methods left much to be desired from an accuracy standpoint because it is only too simple for a lister to transpose figures and it is quite often difficult for him to keep pace with the caller. In addition, handwritten figures are often hard to decipher, especially when set down in a hurry and from a strained position. Where a man both counts and lists, his operation is retarded by having to stop and make his listings.

The first machines used for inventory taking were limited to the cylinder type recording machines but, as the science of voice recording for commercial use progressed, one manufacturer developed an instrument which uses as its recording medium an endless plastic belt capable of retaining 15 to 30 minutes of continuous recording. The recording unit consists of a chest microphone, a combination hand control and flashlight, and three microphone cables, weighing together slightly over forty pounds when packed in a traveling case. The arrangement makes it possible to have both hands free for taking inventory and to make continuous recording while counting. The machine also permits an operator to listen back instantly, even permitting a second person to listen while the inventory taker is recording.

There are many advantages in using this type of inventory recorder control. Among them are economy, accuracy, and a permanent initial entry that cannot be disputed. The plastic belts may be either mailed or delivered to the office and the information contained is taken down directly from the belt and placed on the records. On average performance, a comptometer operator can completely post a 15-minute belt in approximately 18 minutes, or a 30-minute belt in approximately 36 minutes. The machines are now being successfully used in many types of retail establishments throughout the country and have proved to be a very definite and vital adjunct to today's methods of inventory control and merchandising.

Contributed by C. L. FANCHER, *Bridgeport Chapter*

TWO COMPACT FORMS FOR THE MEASUREMENT OF OPERATING PERFORMANCE UNDER STANDARD COSTS

by NORMAN A. COAN,
Manager, Sales Division Control Department, Marathon Corp.,
Menasha, Wis.

What the forms used in connection with a cost system mirror may be of prime importance. The present article is descriptive of two forms, each of which has demonstrated usefulness in the operation of standard costs in a characteristic manufacturing situation. In one instance, it is regarded of special moment to know how efficiently chemicals issued to production are being "recovered" in finished goods. In the other, effective use of machine hours holds the same relative significance.

IT may be doubted that any industrial accountant will have to pick two forms to solve all of his problems in the manner of hypothetical choices of books for company on a desert island. However, if there ever is a contest to decide the two most practical forms that will handle the greatest number of industrial accounting situations, I will back the two exhibits shown in this article. These two forms do yeoman's service in the most strategic phase of the standard cost technique—that of applying the standards to units produced in such a way as to develop both *control* and cost *recovery* data.

The two forms presented are basic in principle. They are, of course, flexible as to column headings and number of lines and titles, and may be modified to meet the specific problems of a given operation. They are shown here as actually in use in plants for which the sample entries appearing in Exhibits 1 and 2 reflect typical data. Slight variations of either form have time after time been set up by staff men or consultants to get something operative to produce fast results only to discover that with a little refinement, a permanent tool has been devised.

Each of the forms is for a different situation and a different degree of application of the industrial accountant's techniques. As each is taken up, there will be occasion to comment on these differences.

Unit Record and Standard Cost of Finished Goods

In the example portrayed in Exhibit 1, this unit record form is an application to a producer of more than 100 compounded

UNIT RECORD AND STANDARD COST OF FINISHED GOODS—ANY PLANT

Spec. No: 1246 Product Name: Any One of Many Net Wt: 120 Kind of Container: Fibre Drum xx Liner Code No: 302
Total Mfg. Cost: 22,250

Year 1948	Unit Record				Production by Specification No.			Units Extended at Manufacturing Standard Costs			
	Beginning Inventory	Shipments	Miscellaneous	Produced	Spec. No.	Units	Pounds	Inventory	Shipments	Miscellaneous	Produced
Jan.	500	1,500	10	1,410	√	1,410	169,200	11,125.00	33,375.00	222.50	31,372.50
Feb.	400							8,900.00			
Mar.											
Apr.											
May											

	Standard Manufacturing Cost Recovered										
Date Cost	Raw Mtl.	Ship Mtl.	Lbr. & Burd. Dept. 1	Lbr. & Burd. Dept. 2	Lbr. & Burd. Dept. 3	Lbr. & Burd. Dept. 4	Lbr. & Burd. Dept. 5	Lbr. & Burd. Dept. 6	Lbr. & Burd. Dept. 7	Lbr. & Burd. Dept. 8	
1-1-48	14,214	785	4,100	2,255		628		268			
Jan.	20,041.74	1,106.85	5,781.00	3,179.55		885.48		377.88			
Feb.											
Mar.											
Apr.											
May											

EXHIBIT 1

products having (1) relatively few and simple operations for any one product, (2) from one to ten separate materials compounded to produce a finished produce, (3) a reasonable number of stocking points of semicompleted compounds (like subassemblies), and (4) a wide variety of packaging and shipping conditions that ran the gauntlet from ounce bottles to cans, jugs, carboys, burlap, cloth and paper bags, wooden, metal, and fibre drums, barrels, and kegs, on up to bulk box cars.

Outline of Costing Setup

The material formulae were reduced to a standard basis. Departments and/or cost center focal points were set up and costs per operation having separate labor and burden rates (burden related to and absorbed over labor because machines and space costs, etc., were not significantly out of line) were developed. These costs were applied to the products manufactured on an operational route list basis to develop a cost per hundred pounds of finished product by contributing departments up to the point of packing and shipping.

Containers were listed according to codes, a code number referred to a complete container as packed, such as a single bag or a bag and liner, or twelve cans with fibre case and wood protectors. Packaging and shipping costs were then developed on a per type of container basis and the packing material cost was included on a net weight basis to result in the full standard cost of a complete package of each product. In addition, the semifinished compounded products were costed up to the points where stocks were accumulated. Products were usually made on a batch basis.

Since a large portion of the daily operations were on an incentive, there was a fair degree of control over direct labor expended, no matter how diversified the production schedule from day to day. The big problems remaining were those of inventory control, cost recovery at standard with resulting credits to departments (or centers) to maintain control of burden as expended in relation to that included in the standard costs, raw materials control, shipping materials control, cost of sales entry, and historical record of each product by type of container.

Heading and Body Data on Form

Let us see how these tasks are approached through the information provided on the Unit Record and Standard Cost of Finished

Goods form displayed as Exhibit 1. Its heading shows the product specification number, name, net weight, kind of container, and container code number for the product item in question. Immediately under the heading at the top right of the form is the total standard manufacturing cost with provision for two changes in this cost (these spaces show blank). Heading information is also carried in the bottom half of the form. There the total standard cost of the product in this particular container is broken down to raw material, shipping material, and labor and burden components of the contributing departments (or centers).

As to the body of the form, the upper left portion under "Unit Record" is a complete monthly historical inventory with a check column to indicate that the shipments reported by the plant agree with the tabulated sales analysis data. This places an audit on all outgoing merchandise. The miscellaneous column is for interplant usage, spoilage, inventory adjustment, etc., and these are charged to these classifications from requisition slips. To the right of this "Unit Record" is a set of columns for production in units and pounds for the purpose of providing a lead to raw materials control. If, however, all or part of the production of this product should be made from a nonstandard formula mix (instead of specification No. 1246 as the sheet is captioned) or if the specifications should be reengineered, the specification number column in this section is used to show the new or nonstandard specification number and the quantities in the production columns would be double-entered (two figures on one line) to show the quantity made from each specification. The remainder of the top half of the form repeats the unit record inventory data but at standard cost values instead of quantities. These values form the basis for the cost entries on the books—debit or credit to inventory, charge to cost of sales, miscellaneous charges, and total credit to operations at standard cost. The columns in the bottom half of the form break down standard cost recovered to raw materials, shipping materials, and department or center operations.

In actual operation, the apparent month-end bottleneck from use of this form is broken by determining which products or container sizes of a product have completed their activity during the month. Many of the products (perhaps such as in a jobbing foundry) are special for but a few customers. Of a total of several hundred or a thousand such product records, anywhere from a third to a half can be completed on the form before the month

end. By breaking the others down to two or three clerks at month end, the remaining calculations and over-all summary to complete closing data can be accomplished quite rapidly and effectively.

In addition to one form for each product and each type of container for each product, there is one form set up for each semi-finished (or subassembly) product. On these, of course, only the difference in inventory from month to month is entered and this quantity only is extended completely on the form.

Material Usage and Net Departmental Variances

After complete closing data has been summarized according to the columnar headings on the form, the separate sheets are sorted to specification numbers and the total pounds of production by specification number is accumulated. These are applied separately to the base standard formulae, which include standard processing and yield loss factors, and the standard usage quantities of each of the many kinds of raw materials is obtained. The results are compared to actual quantities withdrawn from raw materials inventory and material usage variance by kind of material is thus disclosed. The forms are then resorted by container code number and standard consumption (including waste factor) is developed for each container code. This enables a variance report of usage by type of container.

Since the cost recovery is obtained by departments (or centers) and since the ratio of direct labor, departmental burden, and general plant burden is known for each, the total recovery for any department can be broken to these factors for departmental operating statements. The resulting statements are practical and adequate under certain conditions and in certain industries, plants, or portions of a plant. However, since they net all the variances—such as efficiency, rates of pay, nonstandard methods, calendar, volume, and ratio mix of operating cost increments built into the burden at normal level of computation—these statements are best suited to the industrial accountant's analysis rather than to delivery without interpretation to the operating foreman.

As a whole, the form is admittedly somewhat of the old-fashioned, not so completely engineered type, but it is a veritable work horse and can quickly be adapated to many situations. This type of form can be one of the industrial accountant's best friends.

DAILY OPERATIONS SHEET

This form also performs Herculean tasks but in a different

DAILY OPERATIONS SHEET

Plant: 1 Dept: Auto-Press #10 Shift 2 Date: 12/23/41

SCHEDULED OPERATIONS AND THEIR ENGINEERED STANDARDS								INDUSTRIAL ACCOUNTING'S PERFORMANCE & COST RECOVERY COMPUTATIONS								
Line Oper. No.	Production Order No.	Product or Part	Master Product Spec. No.	Material Stand. No.	Pro-cess	STANDARDS ALLOWED Stand. No.	Crew Size	Line Hrs. per M.	Quantity of Good Production	LINE OR MACHINE PERFORMANCE Stand. Meth.	Actual Meth.	Actual Hours	% Perf.	Cost No.	MAN HOUR PERFORMANCE Stand. Meth.	Actual Act. Meth.
1	4 1240	XYZ 12495	X 4292	X 123	M	1112	3.00	3.00	30000	6.0	7.0	8.0	75	10 1	18.0	32.0
					S	3420	4.00	2.33								
					MS											
		Example is one order scheduled for production by non-standard method			S											
					MS											
					S											
					MS											
		Example of computation of machine hour variances:-			S											
					MS											
		NON-STANDARD VARIANCE: →			S						-6.0					
					MS						1.0 (Loss)					
		OUTPUT VARIANCE:			S						→	-7.0				
					MS							1.0 (Loss)				
		TOTAL (ECONOMIC) VARIANCE: →			S							→	2.0 (Loss)			
					MS											
		Example of computation of Man Hour Variances:-			S											
					MS											
		NON-STANDARD VARIANCE: →			S										→ 18.0	
					MS										10.0 (Loss)	→ -28.0
		OUTPUT VARIANCE: →			S											4.0 (Loss) → -32.0
					MS											
		CREW-SIZE VARIANCE: →			S											8.0 (Loss)
					MS											→
		TOTAL (ECONOMIC) VARIANCE: →			S											32.0 (Loss)
					MS											→
					S											
					MS											
					S											
					MS											

EXHIBIT 2

strata of industrial accounting techniques than the first form shown. It is the David that slays the Goliath of the multiple product, multiple parts, multiple process, high speed, largely mechanical type of industry.

A Problem in Engineered Standards

Here the emphasis is on completely engineered standards covering machine speeds, crew sizes, standard preparations (or setups), standard lengths of run, standard layouts, standard methods, and "nonstandard" standards for all deviations from standard routings. There are engineered standards also for all department and general plant indirect expenses (so-called burden), each engineered down to a fine point in relation to its own generative base.

Daily reports of machine and man hour performance are required to be in each foreman's hands no later than nine o'clock the day following the doing of the work. Usually, due to the complexity of the processes, the recovery measure for work done at standard is accomplished on the machine hour basis and not the products produced basis illustrated by the form to which the first part of this article was devoted. A machine may perform its operations on a hundred different products or parts of products but, rather than recap all of these pieces to a monthly total and then multiply by a hundred different costs at end of month, the daily work is reduced to a "standard machine hours produced" figure and this one figure is accumulated to month's end and then priced at the standard machine hour cost for cost of sales and inventory.

Ordinarily in these circumstances, the procedure is not to add the cost of successive departments' efforts to product and to "roll" this cost along to the finished state before charging it to inventory. Rather, the inventory is charged with the added cost of each operation as the product follows its route to completion. Usually, too, under these conditions, departmental daily operating statements are prepared on a flexible budget-for-work-done basis and the variance between budget and actual is the operating man's problem. Cost recovery being on an engineered basis, the variance between budget and engineered cost recovered is the industrial accountant's problem to explain to management's satisfaction.

Starting With Scheduled Production

It hardly seems that, with all the factors mentioned in the foregoing paragraph any one form on an 8½" by 11" sheet would

EXHIBIT 2

stand a chance in tackling such a many-faceted giant. Let us see what our little David or—to drop the figure—the Daily Operations Sheet, Exhibit 2, does in respect of the cost and production data which confronts it.

To begin with, the background of the form may be a production schedule with exactly the same layout to that point as the left-hand half of Exhibit 2 comprising the columns under "Scheduled Operations and Their Engineered Standards." Our form, as captioned, is for a particular shift in a specified department and plant. However, in any particular case, it may be for whatever operating unit the production scheduling department identifies in its work. The schedule literally tells the foreman what he is to run and how long it should take to do it at standard. The foreman has what amounts to an operating report at standard for individual operations scheduled before he starts to produce and he can be quite aware of his progress against standards as the day's work progresses although the *complete* performance data at the right under "Industrial Accounting's Performance and Cost Recovery Computations" is not available until the day is over. This is an ideal goal. Sometimes it is more practical to issue the schedule on a weekly basis. Under this arrangement, the timekeeper, department clerk, or industrial accountant's staff will prepare one of the exhibited forms daily and for each shift. The shift schedules will be combined into a weekly report.

Preparations (setups, etc.) can be included in data for the related order or handled as a separate order. The method depends greatly on circumstances. The main points are that the department should be measured, in part, on the efficiency with which it performs the preparations and that the production planning department should be aware that it is scheduling preparations within the standard length of run limits. Also, the industrial accountant must provide control figures covering both preparation and run and still tie his cost recovery to engineered standards which include preparation costs.

Reflecting Performance

The detailed columns in the left-hand section of the form are perhaps self-explanatory, except that there may be some question why a production or part number, a master product specification number, a material standard number, and a standard number are all necessary. They are not necessary if the complete engineered

standard system is started at one time under a central head. If so perhaps there would be but two numbers—the master product specification and the standard number. Actually, however, procedures underlying the preparation of comprehensive processing data are quite often developed piecemeal and the numbers in use are not all related to a common basis. It may be noted that the standards allowed column makes provision for operation under standard and nonstandard methods. Standard production for the operation, standard crew size, and standard line hours (machine hours) are called for. The operation illustrated is a high speed mechanized operation, the machine hour standard being .2 per thousand pieces produced. This is standard production at the rate of 5000 per hour.

The columns in the right-hand section of Exhibit 2 cover performance. They start with actual production of good pieces. When this is known the machine or line hours which would be required for this quantity under the standard method and under the nonstandard method can be obtained by reference to the "standards allowed" data and compared with each other and with the actual hours, to obtain per cent performance as shown and to permit computation of the illustrated nonstandard and output variances for the operation. The same is true of man-hour performance with the inclusion also of crew-size variance.

Attention may be called to the inclusion of the cost center number in the performance section of the sheet. This is inserted by the industrial accountant after reference to his standards and route sheets so that he is certain he has the same cost center to deal with here as he originally built into his engineered cost of the product. It is the industrial accountant's guide for his cost recovery entry for, when all the items on this form are computed as is the one item illustrated, he will recap his day's (or shift's) production from this department in terms of standard line hours produced, by cost center by standard crew size. These he will price at the month's end by his standard machine hour costs and the resulting debit will go to inventory.

What You Have

At this point, the routine work of our form is done. In addition to providing the average industrial accountant with sufficient figures to cause him to wet his lips in gleeful anticipation (nonstandard and output machine variances, three dimensional operat-

ing labor variances, basis for recapping standard machine hours for cost recovery, production record, and reference to material standards for material recovery and development of material variances) it also affords a very effective operating report in detail by job and machine to give to the foreman without further delay. For this purpose, it should be prepared in duplicate.

The form now provides the industrial accountant with almost all of the usual generative bases for indirect department expenses as developed by the industrial engineers and employed in a daily flexible budgetary allowance for such expenses. Some of these are:

1. Scheduled department hours
2. Standard line (machine) hours produced by type of machine
3. Standard operating labor hours
4. Total actual labor hours
5. Number of machines operated

Also, if the basis of operations employed uses the principle of weighted activity factors, further data can be developed. For example, eight hours of one machine at $50 per hour and eight hours of one machine at $5 per hour *are not* termed simply sixteen hours of activity. The $50 machine is weighted 10 to 1 in relation to the $5 per hour machine and thus the weighted activity would be $10 \times 8 = 80$ for the $50 machine and $1 \times 8 = 8$ for the $5 machine, or a total of 88 factored activity units. The industrial accountant now has that important figure of factored activity which, compared to normal activity, scheduled activity, and capacity, means much in the full understanding of engineering a business.

Conclusion

When you reexamine the two 8½" x 11" forms which have been described and evaluate the functions they perform for the industrial accountant—each form in its own field—I believe we must agree that they do perform yeoman's service on the battlegrounds of industrial accounting.

AN ECONOMICAL PAYROLL SYSTEM FEATURING CENTRALIZED PROCESSING OF EMPLOYEE DEDUCTIONS BY MACHINE METHODS

by D. PHILLIP BEAUDRY, Jr.,

Associate Professor of Economics, Birmingham-Southern College, Birmingham, Ala.

This presentation of a payroll system reports the experience of a company having a number of plants in seeking to render its payroll preparation more economical. Initial endeavors were confined to a study of clerical operations as carried out at each plant. The limited savings achieved in this manner were later augmented by the discovery that it would be practicable to centralize the preparation of the net payrolls from the gross payrolls.

THIS study must necessarily begin with a description of the system that existed prior to that which is the subject of this paper and which relates to a manufacturing company with several plants located close to one another and several thousand wage earners in the aggregate. Although cost and general accounting work were performed at a central office, the timekeeping and payroll functions were performed in their entirety at the individual plants. Each location kept a complete payroll for which it performed all the necessary functions of attendance checking, timekeeping, posting time, rates, and payroll deductions, developing cost and statistical data, maintaining employee earnings and tax records, and accounting for payroll collections. Full time supervision and skilled personnel were required to perform satisfactorily the required duties at these decentralized payroll centers.

Some economy in payroll processing had been effected by efforts prior to the project upon which this paper is principally centered and as a part of a program designed to reduce clerical costs throughout the company. All functions involved in compensating employees for their services were analyzed in detail. During one phase of this program, functions were divided into their most simple elements and time standards were established for each of these elements.

Perhaps the most striking development of this analysis was the disclosure of the number of man-hours consumed in the functions of timekeeping, posting rates and time, extending gross payroll,

posting payroll deductions, and computing net pay. Man-hour budgets made it possible to determine the time that should be necessary to perform the job and to determine actual force requirements. The size of the clerical force was adjusted to the determined work load. This resulted in savings to the company. It was felt that an efficient payroll system was in use.

Studies were also made to determine whether or not there were any material benefits to be derived from the installation of mechanical equipment but it was learned that only forty, fifty, sixty, or seventy man-hours could be saved in each of the payroll centers each month.

Why Not Centralize "Netting Out" of Payroll?

After the system had been in operation a few years, a new idea was injected into the picture which not only completely altered the existing system but also resulted in almost incredible savings. Investigation revealed that a high percentage of supervision was necessitated by the several small payroll centers and also that the broad admixture of tasks of each payroll staff stood in the way of mechanization.

It was determined that more benefit could be derived from improving the procedure for posting payroll deductions and "netting out" the payroll, i.e., going from gross pay to net pay, than in any of the other functions, because deductions from employees' earnings were so many and varied that this phase of the work consumed the greater part of the time required for the entire job. Accordingly, the decision was made to transfer this function to a central payroll division which would serve all plants. This change brought a sufficient volume of the same type of work into one location to permit "deskilling" the occupations and the creation of jobs which were entirely routine. Additional studies were made which indicated that the installation of payroll posting machine equipment at the central payroll division where all deductions from employee earnings were to be processed, would now bring material benefits.

The Present System

It is realized that many payroll systems are in use which are more steamlined than the one we shall now describe. The conditions encountered in various locations account for this fact. However, the important consideration is that this system is tailored

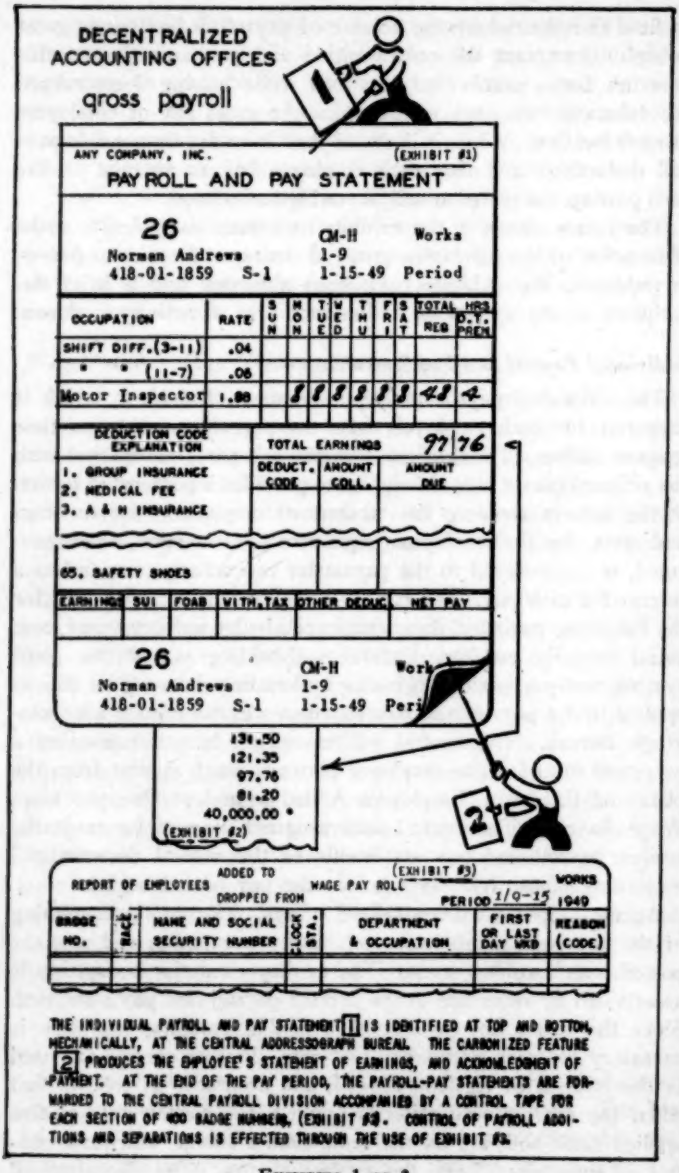
to fit a situation where the volume of payroll deductions is great enough to warrant the centralization and mechanization of this function for a number of locations while leaving decentralized the functions necessary to determine the gross pay of employees at each location. When it is stated that there are 65 possible payroll deductions and that each employee has an average of five each payday, the situation will be readily understood.

The forms shown in the exhibits have been simplified to make illustration of the principles involved clearer and easier to follow. In addition, the exhibits have been animated and a brief description of the operations within each area of activity is shown.

Individual Payroll and Pay Statement

The individual payroll and pay statement, Exhibit 1, which is prepared for each employee, is a two-part form with one-time snapout carbon. The duplicate (employee's part) is identical with the original except that the duplicate provides a perforated section at the bottom showing the amount of employee's net earnings and space for the employee's signature. This section, when executed, is surrendered to the paymaster in exchange for and as a receipt for cash pay. The payroll and pay statement provides for the following statistical data: employee's badge number, name, sex, social security number, Federal withholding tax status, plant symbol, and pay period beginning and ending dates. This data is applied to the payroll and pay statements in the central addressograph bureau. The central addressograph bureau maintains a perpetual file of active employee plates through receipt from the plants of Exhibit 3, Employees Added to and/or Dropped from Wage Payroll. The central addressograph bureau forwards the headed payroll and pay statements to the several decentralized accounting offices four days before the pay period begins.

At the respective decentralized offices, prior to the beginning of the pay period, the employee's *major* occupation and rate are posted with a rubber stamp. The employee's major occupation is ascertained by reference to the current payroll and pay statement. Since the forms are carbonized, a double stamping operation is necessary for each occupation and rate. Rubber stamps are used in the interest of legibility, speed, and accuracy. It follows that when the correct occupation is applied, the correct rate is also applied since both are on the same rubber stamp. Adequate control is maintained over the rubber stamps. The decentralized


DECENTRALIZED ACCOUNTING OFFICES
gross payroll
1
ANY COMPANY, INC. (EXHIBIT #1)
PAY ROLL AND PAY STATEMENT
26
Norman Andrews
418-01-1859 S-1
CM-H Works
1-9
1-15-49 Period
OCCUPATION | RATE | SUN | MON | TUE | WED | THU | FRI | SAT | TOTAL HRS REG | O.T. PREM
SHIFT DIFF.(3-11) | .04
" " (11-7) | .06
Motor Inspector | 1.80 | 8 | 8 | 8 | 8 | 8 | 8 | 48 | 4
DEDUCTION CODE EXPLANATION
1. GROUP INSURANCE
2. MEDICAL FEE
3. A & H INSURANCE
65. SAFETY SHOES
TOTAL EARNINGS 97 76
DEDUCT. CODE | AMOUNT COLL. | AMOUNT DUE
EARNINGS | SUI | FOAB | WITH. TAX | OTHER DEDUC. | NET PAY
26
Norman Andrews
418-01-1859 S-1
CM-H Work
1-9
1-15-49 Peri
134.50
121.35
97.76
81.20
40,000.00 *
(EXHIBIT #2)
2
REPORT OF EMPLOYEES ADDED TO DROPPED FROM (EXHIBIT #3) WAGE PAY ROLL WORKS
PERIOD 1/0-15 1949
BADGE NO. | RACE | NAME AND SOCIAL SECURITY NUMBER | CLOCK STA. | DEPARTMENT & OCCUPATION | FIRST OR LAST DAY WKD | REASON (CODE)

THE INDIVIDUAL PAYROLL AND PAY STATEMENT [1] IS IDENTIFIED AT TOP AND BOTTOM, MECHANICALLY, AT THE CENTRAL ADDRESSOGRAPH BUREAU. THE CARBONIZED FEATURE [2] PRODUCES THE EMPLOYEE'S STATEMENT OF EARNINGS, AND ACKNOWLEDGMENT OF PAYMENT. AT THE END OF THE PAY PERIOD, THE PAYROLL-PAY STATEMENTS ARE FORWARDED TO THE CENTRAL PAYROLL DIVISION ACCOMPANIED BY A CONTROL TAPE FOR EACH SECTION OF 400 BADGE NUMBERS, (EXHIBIT #3). CONTROL OF PAYROLL ADDITIONS AND SEPARATIONS IS EFFECTED THROUGH THE USE OF EXHIBIT #3.

EXHIBITS 1 TO 3

offices post the hours worked to the payroll and pay statements from occupational force reports, time sheets, and labor abstracts. Manual postings of hours worked are made in three colors (black, 7 p.m. to 3 p.m. turn; red 3 p.m. to 11 p.m. turn; blue, 11 p.m. to 7 a.m. turn) to provide for the proper payment of shift differential rates in accordance with the labor contracts. All hours posted are verified by clock card attendance records. Hours worked are accumulated by occupation and pay period totals are posted to the individual form for each employee. The total hours for each occupation are multiplied by the occupational rates and the resultant gross earnings are manually entered. All payroll computations are verified by a second person.

Upon completion of the gross earning computations and verifications, the payroll and pay statements are forwarded to the central payroll division accompanied by control adding machine tapes, Exhibit 2, of the gross earnings for each payroll section and a grand total for the department roll. To facilitate and expedite the payroll functions, the payroll is divided into sections. Sectionalization of the payroll also affords more flexible and adequate controls. The sectional gross earnings are manually posted to their respective payroll deduction controls discussed later and are proven in the related machine posting operations.

Sources and Control of Deductions from Gross Pay

Employees' payroll deductions are those items authorized by law or by the employee and which are deducted from the employee's gross earnings to obtain his net earnings. Basically, there are three types of payroll deductions: (1) *"legal"*—Federal withholding tax, Federal and state unemployment insurance taxes, (2) *fixed*—medical fee, union dues, group insurance premiums, accident and health insurance premiums, house rent, etc., and (3) *variable*—credit union collections, hospital collections, and plant accounts receivable items.

Employee's Deduction and Account Records—The deduction and account records illustrated by Exhibits 4 and 5 constitute a loose leaf accounts receivable ledger by employee. A separate sheet is provided for each accounts receivable item for each employee except in the case of certain fixed deductions, i.e., insurance, medical fee, and union dues. For convenience in posting to payroll these fixed deductions, as may be seen from Exhibit 4, are

CENTR DIVISION

ANY COMPANY, INC. (EXHIBIT #5)

EMPLOYEE DEDUCTION AND ACCOUNT RECORD

HOSPITAL ACCOUNT Code 12

26

Norman Andrews $8

418-01-1859 S-1

FIRST PERIOD 5-A & H INS.	SECOND PER. 18-UNIT SCHG	SECOND PER. 2-MEDICAL FEE	FIRST PERIOD 6-GROUP INS.
2.30	1.50	2.00	1.75

DATE	CODE	DEBIT	DATE	CODE	CREDIT	BALANCE
JAN 1	RC	131.00				131.00
			JAN 3	PC	8.00	123.00
			JAN 10	PC	8.00	115.00

ANY COMPANY, INC. (EXHIBIT #5)

EMPLOYEE DEDUC. & ACCT. RECORD

HOUSE RENT ACCOUNT

26

Norman Andrews

418-01-1859 S-1

CODE 54 8.80/8.00

HOUSE NO. 141 VENTURA AVE.

BASE RENT	
ELECT.& WATER	
APPLIANCES	
TOTAL RENT	16 80

DATE	CODE	DEBIT	DATE	CODE	CREDIT	BALANCE
JAN 1	RC	16.80				16.80
			JAN 3	PC	8.80	8.00
			JAN 10	PC	8.00	.00

ANY COMPANY, INC. (EXHIBIT #6)

PAYROLL COLLECTION REQUEST

YEAR 1949 CODE 7

FROM MUTUAL CREDIT UNION

COLLECT FROM Norman Andrews

WORKS CH-H BADGE NO. 26

PAY PERIOD	BALANCE	AMOUNT DUE	COLLECTED
JAN.	20 00	10 00	
	10 00	10 00	
FEB.			

ANY COMPANY, INC. (EXHIBIT #7)

PAY ROLL ADVANCE ORDER 1/13/49

NORMAN ANDREWS (EMPLOYEE) BADGE NO. 26 REQUESTS ADVANCE

NOT TO EXCEED Five and No/100..... DOLLARS($ 5.00)

DUE TO Sickness APPROVED, PROVIDED EMPLOYEE HAS SUFFICIENT EARNINGS TO HIS CR.

Joe Quinn (DEPT. FOREMAN) John Saunders (FOR SUPERINTENDENT)

CASHIER: PAY TO ABOVE THE AMOUNT OF CODE 15

Five and No/100... DOLLARS ($ 5.00)

CHARGE PAY ROLL ENDING 1/15/49 1949 Geo Thomas CHIEF TIMEKEEPER

RECD PAYMENT I AUTHORIZE DEDUCTION FROM MY EARNINGS AS SHOWN ABOVE

Norman Andrews EMPLOYEE

WHILE GROSS EARNINGS ARE BEING DEVELOPED, OPERATIONS CONCERNING [illegible] MACHINE POSTED TO EMPLOYEE RECEIVABLE LEDGERS [3] FROM BILLS [illegible] SHEETS, ANTICIPATING COLLECTION. THE CREDIT POSTING TO THE LED[illegible] ON THE PAYROLL DEDUCTION CONTROL (EXHIBIT #6). PAYROLL COLLECTI[illegible] SECTIONAL TOTALS FOR EACH DEDUCTION ARE RECORDED ON THE CONTROL [illegible]

RE PROCEEDING [illegible] WITH RECURRIN[illegible] CONTROL TAPE FO[illegible] #9 ARE RECEIVE[illegible] EARNINGS ARE

DIVISION

accounting for deductions

ANY COMPANY, INC. (EXHIBIT #8)

PAYROLL SECTIONAL CONTROL - FIXED DEDUCTIONS

PAYROLL SECTION 1 BADGE NOS. 1 TO 400

BADGE NO.	NAME	REA-SON	ADV. PREM.		REGULAR ADJUSTMENTS		
			GROUP	A&H	GROUP INS.	MED. FEE	A&H INS.
	TOTAL TO DATE						

ANY COMPANY INC. (EXHIBIT #9)

PAYROLL DEDUCTION CONTROL

SECTION 1 BADGE NO. 1 TO 400 PERIOD 1/9-15/49

CODE NO.	LEDGER ACCT.	ITEM	AMOUNT DUE	EXCEPTIONS	NET COLL.
1	1ST	GROUP INSURANCE			
2	"	MEDICAL FEE			
3	"	A & H INS. 4060			
4	20.01.8	US SAVINGS BONDS			
5	1ST	ECO CREDIT UNION			
6	"	A&S CREDIT UNION			
7	"	MUTUAL CRED. UN.			
8	"	CITY CRED.UNION			
10	"	UNION DUES			
12	15.13	HOSPITAL			
13	15.13	COKE AND ROLL			
14	20.11	GARNISHMENTS			
15	1ST	CASH ADVANCES			
16	"	COMMUNITY CHEST			
17	"	DEBTORS COURT			
54	17.01	HOUSE RENT			
65	15.13	SAFETY SHOES			
		TOTAL OTHER DEDUCTIONS			
		SUI TAX			
		FOAB TAX			
		WITHHOLDING TAX			
		GRAND TOTAL DEDUCTIONS			
		TOTAL EARNINGS			
		NET EARNINGS			

RE PROCEEDING AT THE CENTRAL PAYROLL DIVISION. DEBIT ENTRIES ARE WITH RECURRING ACCRUALS. CREDIT ENTRIES ARE PRE-POSTED TO LEDGER NTROL TAPE FOR EACH PAYROLL SECTION, AND THESE TOTALS ARE RECORDED) ARE RECEIVED FROM VARIOUS SOURCES WITH A CONTROL TAPE ATTACHED. EARNINGS ARE RECORDED FROM THE TAPES (EXHIBIT #2).

shown on a single accounts receivable ledger sheet for the employee. All entries to the employees deduction and account records are machine posted before the payroll closing begins.

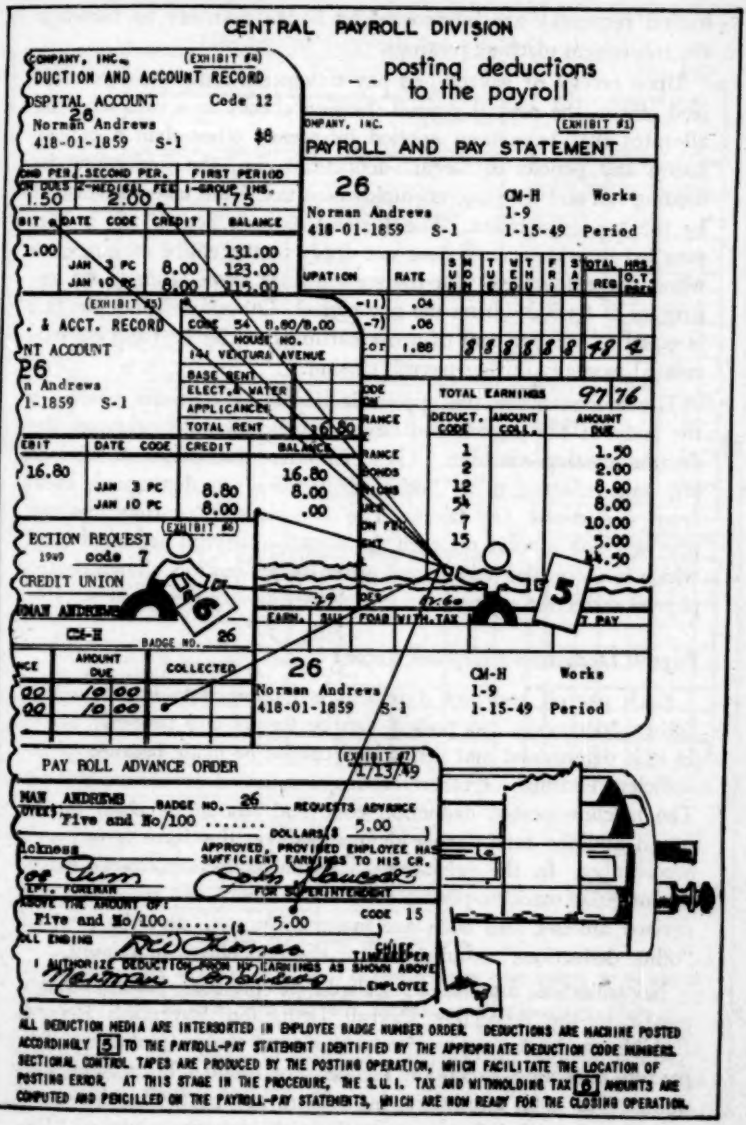
Payroll Collection Requests—Payroll Collection Requests, Exhibit 6, are submitted for collection of accounts from employees indebted to various company-sponsored creditors, such as the credit unions. These forms, as prepared at source, reflect the employee's badge number, name, and amount due for collection. Payroll collection requests move each pay period between the payroll center effecting collection and the office desiring collection. They are submitted from the source desiring collection and are accompanied by verified adding machine tapes of the sectional totals and of the grand total amount due. Payroll Advance Orders, Exhibit 7, are issued to allow an employee to draw a portion of his wages in advance of payday and are handled, in general, in the same manner as are payroll collection requests.

Fixed Deduction Control—Fixed deductions are controlled on a continuous basis by use of the form shown in Exhibit 8, Payroll Sectional Control—Fixed Deductions. The total, as originally established from deductions then in force, is changed in the following manner. As employees are added to the payroll who are subject to one or more of the fixed deduction accounts, debit entries (black) are posted to the control. As employees who were subject to fixed deductions are dropped from the roll, credit entries (red) are posted to the form. At the end of the pay period the debit and credit entries are added and/or subtracted from the amount due for collection at the beginning of the pay period. The resulting net "amount due" figures are transferred to the corresponding sectional Payroll Deduction Control, Exhibit 9.

Sectional Payroll Deduction Control—As mentioned earlier, payroll collection requests are received by the central payroll division from various sources. The sectional totals are posted to the applicable accounts and in the column captioned "amount due" on Exhibit 9. The deductions classified as "legal" are not determined until the time the payroll is closed.

Posting Deductions to Individual Payroll and Pay Statements

Prior to the posting of deductions to the payroll, all deduction data (employee's deduction and account records and payroll col-


CENTRAL PAYROLL DIVISION
posting deductions to the payroll
PAYROLL AND PAY STATEMENT
Norman Andrews
418-01-1859 S-1
1-15-49 Period
PAY ROLL ADVANCE ORDER
ALL DEDUCTION MEDIA ARE INTERSORTED IN EMPLOYEE BADGE NUMBER ORDER. DEDUCTIONS ARE MACHINE POSTED ACCORDINGLY 5 TO THE PAYROLL-PAY STATEMENT IDENTIFIED BY THE APPROPRIATE DEDUCTION CODE NUMBERS. SECTIONAL CONTROL TAPES ARE PRODUCED BY THE POSTING OPERATION, WHICH FACILITATE THE LOCATION OF POSTING ERROR. AT THIS STAGE IN THE PROCEDURE, THE S.U.I. TAX AND WITHHOLDING TAX 8 AMOUNTS ARE COMPUTED AND PENCILLED ON THE PAYROLL-PAY STATEMENTS, WHICH ARE NOW READY FOR THE CLOSING OPERATION.

GROUPING OF EXHIBITS 1 AND 4 TO 7

lection requests) are intersorted by badge numbers to facilitate the subsequent machine postings.

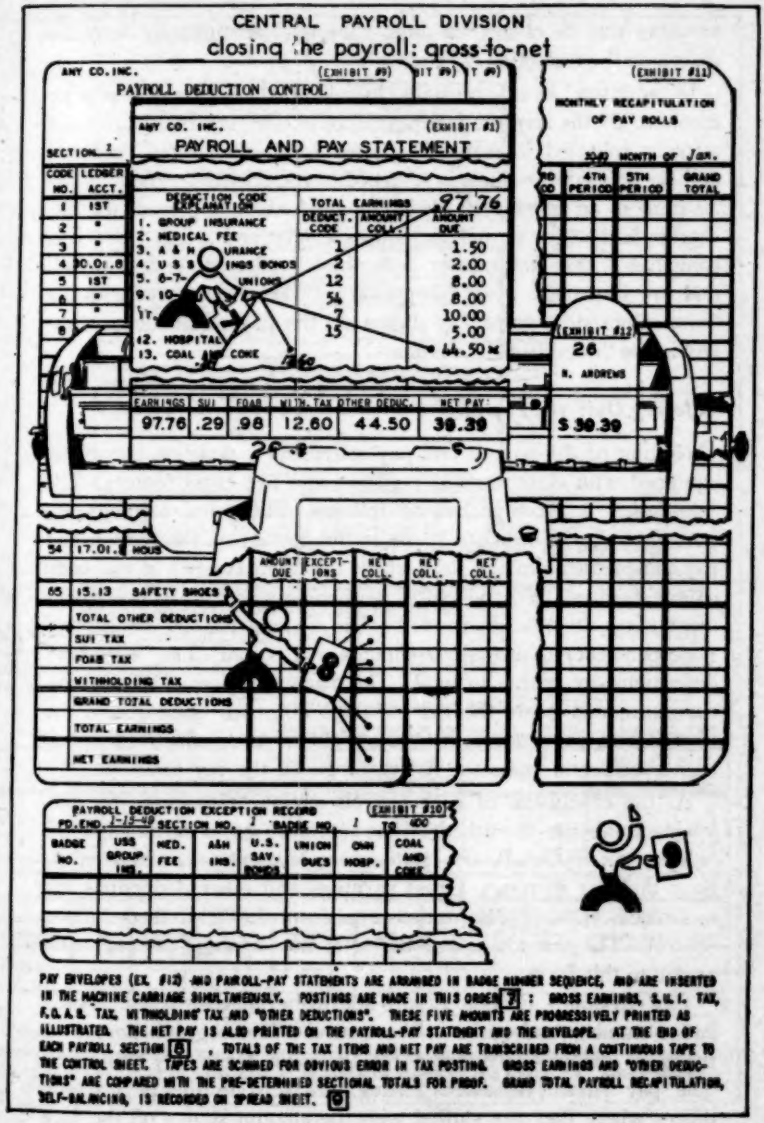
Upon receipt of payroll and pay statements from the decentralized offices, the central payroll division checks to a rate schedule all rates that have been applied by means other than a rubber stamp and pencils in "legal" deductions, i.e., the Federal withholding tax and the state unemployment tax, from tables furnished by the tax department. The Federal old age benefit tax is also penciled in whenever it does not apply to the entire earnings, as when the employee's year-to-date earnings have attained an aggregate of $3,000 during the pay period. Otherwise, since the tax is equal to one per cent of gross earnings, it can be (and is) calculated mentally during payroll closing.

The amounts and the applicable deduction code are posted in the body of the payroll and pay statement by a two-register deduction posting machine. These employee-authorized deductions are now referred to as "other deductions" to distinguish them from deductions for taxes. The two-register posting machine provides for a total on each form and a payroll sectional total which is reconciled with "total other deductions" as shown on the payroll deduction control.

Payroll Deduction Exception Record

Each payroll and pay statement is examined to ascertain that "other deductions," as posted, can be legally and properly made. If it is determined that deductions cannot be made because of insufficient earnings or other reasons, a specified procedure obtains. The machine-posted deduction code and amount is ruled out in pencil and the total "other deductions" on the form is adjusted accordingly. In the event that a partial collection can be made, the original machine-posted code and amount are ruled out, the revised amount and code are manually posted, and the total of "other deductions" is adjusted for the noncollectible amount.

Noncollectible amounts are called "exceptions." Exceptions are posted to the respective Payroll Deduction Exception Record, Exhibit 10, in the appropriately captioned account columns. The payroll deduction exception records are totalled by account columns. The total exceptions by account are posted to the corresponding payroll deduction controls in the column captioned "Exceptions." The exceptions are subtracted from the predetermined


CENTRAL PAYROLL DIVISION
closing the payroll: gross-to-net
PAYROLL DEDUCTION CONTROL
PAYROLL AND PAY STATEMENT
MONTHLY RECAPITULATION OF PAY ROLLS
PAYROLL DEDUCTION EXCEPTION RECORD
PAY ENVELOPES (EX. #12) AND PAYROLL-PAY STATEMENTS ARE ARRANGED IN BADGE NUMBER SEQUENCE, AND ARE INSERTED IN THE MACHINE CARRIAGE SIMULTANEOUSLY. POSTINGS ARE MADE IN THIS ORDER 7 : GROSS EARNINGS, S.U.I. TAX, F.O.A.B. TAX, WITHHOLDING TAX AND "OTHER DEDUCTIONS". THESE FIVE AMOUNTS ARE PROGRESSIVELY PRINTED AS ILLUSTRATED. THE NET PAY IS ALSO PRINTED ON THE PAYROLL-PAY STATEMENT AND THE ENVELOPE. AT THE END OF EACH PAYROLL SECTION 8 , TOTALS OF THE TAX ITEMS AND NET PAY ARE TRANSCRIBED FROM A CONTINUOUS TAPE TO THE CONTROL SHEET. TAPES ARE SCANNED FOR OBVIOUS ERROR IN TAX POSTING. GROSS EARNINGS AND "OTHER DEDUCTIONS" ARE COMPARED WITH THE PRE-DETERMINED SECTIONAL TOTALS FOR PROOF. GRAND TOTAL PAYROLL RECAPITULATION, SELF-BALANCING, IS RECORDED ON SPREAD SHEET. 9

EXHIBITS 10 TO 12
(Reference inclusion of Exhibits 1 and 9)

amounts due to obtain the "net collected" amounts by accounts shown on the deduction control.

In addition, it is necessary to adjust the deduction posting medium. If the medium is a payroll collection request, the amount actually collected is manually posted in the "collected" column, and the collection request is returned to the initiating office. If the medium is an employee's deduction and account record, the exception is machine-posted thereon as a debit and a new balance is computed. The "total other deductions" reflected on the payroll and pay statements after exceptions are taken must agree with the "total other deductions" as shown on the payroll deduction control in the "net collected" column.

"Closing Out" the Payroll

Netting of the payroll and pay statement is done on a machine equipped with eight vertical registers and two cross-footers. The "close-out" is accomplished as follows. The gross earnings are posted to the appropriate space at the bottom of the payroll and pay statement from the data which has been entered in the body of the form. The hand-posted withholding and state unemployment taxes are machine-posted. The Federal old age benefit tax (one per cent) is mentally computed and posted. The "all other" deductions are posted in total. The machine automatically spaces, computes, and posts the net earnings due each employee to the payroll and pay statement at the right of the deductions and it then spaces and posts the net earnings on the pay envelope.

At the conclusion of each payroll section "close-out," the following totals are furnished by the machine: gross earnings, withholding tax, F.O.A.B. tax, state unemployment tax, other deductions and net earnings. Gross earnings and other deductions are reconciled with predetermined totals on the payroll deduction control. The tax totals and the total net earnings are manually posted to this form.

Pay envelopes, Exhibit 12, are addressographed with employee's badge number and name at the central addressograph bureau in the same manner as outlined for the payroll and pay statement. The pay envelopes, after posting, are sent to the paymaster's offices where they are stuffed with the amount shown on the face and are then forwarded to the decentralized accounting offices on pay day.

CENTRAL PAYROLL DIVISION

payroll records

ANY COMPANY, INC. (EXHIBIT #1)

PAYROLL AND PAY STATEMENT

26 CM-H Works

Norman Andrews 1-9

418-01-1859 S-1 1-15-49 Period

DEDUCTION CODE EXPLANATION	TOTAL EARNINGS 77.76		
	DEDUCT. CODE	AMOUNT COLL.	AMOUNT DUE
1. GROUP INSURANCE	1		1.50
2. MEDICAL FEE			
3. A & H INSURANCE	2		2.00

EARNINGS	SUI	FOAB	WITH. TAX	OTHER DEDUC	NET PAY	AMOUNT DUE
97.76	.29	.98	12.60	44.50	39.39	

26 CM-H Works

Norman Andrews 1-9

418-01-1859 S-Q 1-15-49 Period

EARNINGS	SUI	FOAB	WITH. TAX	OTHER DEDUC	NET PAY
98.50	.30	.99	12.90	36.70	47.61

26 CM-H Works

Norman Andrews 1-2

Employees' Earnings and Tax Record (EXHIBIT #13)

DATE OF BIRTH Feb. 29 1912

CONTRIBUTORY PENSION DATA

NON PARTICIPANT ____ CP 15

PARTICIPANT ACTIVE NO. ____

VACATION DATA: NO. WKS. VACA. DUE 2; PAY PERIOD PAID ____

26 CM-H Works

Norman Andrews

418-01-1859 S-1

DATE CONTINUOUS SERVICE BEGAN 3/4/42

ACCUMULATED PENSION SERVICE ____ YRS ____ MOS. ____ DAYS

CURRENT EARNINGS	WITHHOLDING TAX	CONTRIBUTORY PENSION	EARNINGS QUARTER TO DATE	EARNINGS YEAR-TO-DATE	PROOF	TAXABLE LIMIT RED FIGURES UNDER BLACK FIGURES OVER
98.50	12.90		98.50	98.50	197.00	2001.50
97.76	12.60		196.26	196.26	392.52	2803.84

W-2'S ISSUED

EARNINGS	TAX	EARNINGS	TAX	EARNINGS	TAX

ADDITIONAL W-2 (YEAR TO DATE LESS ISSUES)

EMPLOYED - TERMINATED

DATE HIRED 1ST	DATE HIRED LAST	REASON TERM. CODE
3/4/42		

CURRENT POSTING OF EMPLOYEE EARNINGS AND TAX RECORDS [10] HAS A LEVELING EFFECT ON THE PAYROLL DIVISION WORK-LOAD. PERIODIC PEAKS ARE FORESTALLED BY THE CUMULATIVE FEATURE OF THIS RECORD; ALSO, SIGNALS WARNING OF THE APPROACH OF THE $3,000 TAXABLE LIMIT ARE HELPFUL IN THE CLOSING OF CURRENT PAYROLLS.

EXHIBIT 13

(Reference inclusion of Exhibit 1)

Recapitulations; Earnings Records; Filing Payroll Records

Each pay period a recapitulation of payroll deduction control sheets is prepared and recorded in the appropriate period column on the Monthly Recapitulation of Payrolls, Exhibit 11. The monthly recapitulation provides for the same detail as shown on the control sheets. When it is summarized for the month, it is used in the preparation of monthly payroll journal vouchers.

After the close of each pay period, the payroll and pay statements are used as a source of entry for posting the Employee's Earnings and Tax Record, Exhibit 13, posting being made on the same machine used for netting the payroll. It will be observed that the form provides for posting current earnings, withholding tax, pension contributions, earnings quarter-to-date, earnings year-to-date, proof, and taxable limit. In the taxable limit column the machine records, through use of the $3,000 constant, earnings under $3,000 in red and over $3,000 in black. The earnings for the calendar quarter to date are used in the preparation of Federal and state social security tax returns. The earnings for the current year are used in the preparation of withholding tax statements. Postings are balanced by payroll section.

After the posting of employee's earnings and tax records, the original payroll and pay statements are filed in current year files by badge number. At the end of each calendar year, all payroll statements in the current year's file are transferred to permanent files which are maintained alphabetically by employee's surname. The reason for this alphabetical filing is that, over a number of years' service, employees may have several badge numbers as a result of having worked at different plants in the company, with the assignment of a different badge number at each plant. The alphabetical file constitutes a permanent payroll record for each employee.

Profitable Opportunities for the Inquiring Mind

The payroll installation here presented has resulted in fewer errors, more rapid closing of payroll, provision for handling a larger volume of work, and more complete and detailed information for management and the employee. It has also resulted in a sixteen per cent reduction in the number of people engaged in timekeeping and payroll work. Its extreme flexibility would permit its adaptation to other manufacturing companies as well as to mining companies and companies in still other lines.

The Insurance Responsibilities of the Controller

Among the many duties of the controller is the ascertainment that the properties of the corporation are properly and adequately insured. This is logical since the controller has at first hand a record of insurable property at cost or other value basis and also has underlying information on the profit expectancy of each division of the business. He is in a position to know when inventories increase or decrease, when equipment is moved from one location to another, and when new equipment is installed or old equipment is disposed of. Most industrial concerns are in a constant state of change and his responsibility should be that of maintaining at all times the proper amount of insurance coverage so that his company will suffer no loss due to a fire or other insurable event. A continuous check of property values must be made by the controller and any important changes should be reflected in the insurance policies immediately.

Besides the watching of changes which occur in the insurance requirements of a business, there is the necessity for carrying the proper amount of insurance to start with. No one wants to carry too much insurance or too little. In view of today's replacement prices this consideration, in itself, presents quite a problem. Buildings or machinery acquired, say, ten years ago and depreciated on the books on the conventional straight-line basis, will most likely have a book value far below what it would cost today to replace them. It may be advisable to obtain a detailed present-day valuation of all of the company's properties. Repair or replace coverage may be desirable. This is probably the most modern development in fire insurance and has filled a very definite need, particularly during these days of inflationary values. Under the old type of fire insurance policy settlement is made on the basis of the cash value of the property at the time of the fire, which means cost new less depreciation. If insured on a repair or replace basis, the assured can collect in case of loss an amount equal to the cost new of buildings, machinery, and equipment of like size, kind, and quality, providing the property is replaced. This type of insurance coverage is worth careful consideration.

Another responsibility of the controller should be to obtain the insurance protection at the lowest possible cost. There are different types of insurance companies, such as stock insurance companies, mutual insurance companies, reciprocal organizations, etc. The net cost of insurance provided by the different types of insurance companies may vary considerably. A thorough investigation should be made. In our company, we discovered that our fire insurance could be obtained at a much lower cost from a group of companies known as the factory mutuals. The factory mutuals require an initial premium deposit based upon a study of the particular risk by a trained engineer. The deposit remains with the insurance company until the end of the policy term. During the term of the policy, the deposit is constantly being reduced or absorbed on a proportionate basis and it is used to pay the losses and expenses of the company. The absorption represents the insurance cost to the assured, inasmuch as the remaining deposit is returned to the policy holder or credited to the renewal Currently the per cent of absorption with our particular factory mutual company is about ten per cent a year. The

factory mutuals set up strict requirements for membership and, as a rule, will not insure unless these requirements are met. The requirements include:

1. Slow-burning or fire resistant construction for main buildings.
2. Very high standards of neatness and order.
3. Automatic sprinklers where necessary, backed up by strong water supplies including private hydrants, fire hose, hand extinguishers, etc.
4. Regular watchman service with watch clock, while plant is not in regular operation.
5. Fire barriers by masonry walls and fire doors between important divisions.
6. Isolation of hazardous processes and materials.

Other types of insurance companies serve their insureds equally well. The point is that in placing insurance for a company, a careful investigation of the different types of insurance companies should be conducted.

In addition to regular fire insurance, most industrial concerns have a need for use and occupancy insurance. The actual loss of inventories or machinery due to a fire may not be large, but the interruption of production and the consequent loss of profits may be a considerable sum. Provision must also be made for the protection of the company against dishonesty, robbery, theft, etc. In some states it is now possible to procure what is known as a comprehensive crime policy which covers dishonesty of employees, burglary and theft of merchandise, safe burglary, robbery, destruction of or damage to money or securities or money orders, counterfeit paper currency and forgery. Most companies likewise have a need for general liability insurance, workmen's compensation insurance, and automobile fire, theft, property damage and liability insurance. Boiler insurance is also a must where high pressure boilers are in use. Group life and health insurance and life insurance on the owner or executives should also be considered.

The independent responsibility of management in avoiding hazards must also be mentioned. The plant should be clean and orderly, properly protected, and sprinklers should be provided where necessary. All possible safeguards against injuries should be provided. Prevention of fire before it occurs and prevention of accidents before they happen should be the aim of management in a well-run plant.

Contributed by HORACE S. GORDON, *New Haven Chapter*

A DETAIL-POSTED GENERAL LEDGER THROUGH THE USE OF TABULATING EQUIPMENT

by STANLEY G. WALL,
Chief Statistician, Minnesota & Ontario Paper Co.,
Minneapolis, Minn.

While it is known that it is possible to prepare a general ledger from punched card listings, the practicability in any particular instance, as well as the desirability, are not matters of general agreement. The ten year step-by-step history of such an installation is briefly narrated in this article and the completed procedure, satisfactory in the experience of the author's company, is described.

WE installed our first electric accounting machines about ten years ago. Each step towards more extensive application of the accounting machine setup was well planned in advance with sometimes two and three months of duplicate record keeping while a change was in process. Perhaps our greatest challenge was the idea of a general ledger posted automatically.

Journal Voucher Mechanization

It became evident to us from the start that we would not be able to have a complete detailed ledger from a machine right away, whatever selection of equipment might be made. Some way had to be devised so that we could make the transition in steps over whatever period of time seemed advisable and still have our records intact and all detail necessary available at all times. We went first to what we called a total-posted general ledger. The ledger, itself, was mechanized in that we posted it on a bookkeeping machine. However, the underlying data was more completely mechanized. We instituted punched card and tabulating machine listing procedures, first for accounts payable distribution, then for intercompany transactions, and finally for the regular journal vouchers. We then posted totals from these runs to the general ledger monthly.

1. Each day the tabulating section received a copy of every cash voucher issued by the company the day before. These were punched, tabulated for checking, and corrected daily. Into these cards went date, company number, voucher

MINNESOTA AND ONTARIO PAPER COMPANY

GENERAL LEDGER

122 PREPAID EXPENSE — MONTH OF DEC. 1948

Name	Sub Acc't	Date Mo.	Date Day	Reference	Debit	Credit	Month Total	Balance
122 1 Prepaid Insurance								
Balance Forward		11	30					133,312.88
Wirt Wilson and Co.		12	31	CV121811	1,062.50			
Marsh McLennan		12	31	CV121813	193.89			
		12	31	JV 1202		448.41		
		12	31	JV 1202		127.68		
		12	31	JV 1202		7,375.29		
		12	31	JV 1249	136.25			
		12	31	JV 1249	133.90			
							6,424.84* CR	126,888.04*
122 2 Prepaid Work. Comp. Ins.								9,330.00
Balance Forward		11	30				*	9,330.00*
122 3 Prepaid Rents								
Balance Forward		11	30					637.08
Johnson Victor E.		12	3	CV120191	75.00			
Minn. State of		12	10	CV120639	8.00			
		12	31	JV 1201		81.55		
							145*	638.53*

NOTE: Figures are hypothetical.

EXHIBIT 1

To
wa
in
pu
vo
inc
am
pla
on
ing

number, account number, amount, and vendor's name. At the end of each month, these vouchers were accumulated by account on the machine with debit distribution printing in the debit column and cash credits and discounts falling in the credit column. When completed, this tabulation served as our journal voucher covering account distribution of the voucher register for the month.

2. As we are the parent company of several subsidiaries whose services and goods are used by either a subsidiary or the parent company, there are numerous billings covering intercompany transactions. Copies of these billings were sent to the general office and accumulated until the end of each month. After the billings were all in, cards were punched for them, verified, tabulated by account, and balances checked to all divisions involved. When so tied in, these were tabulated by account totals to serve as the journal voucher covering account distribution of all intercompany transactions for the month.
3. After placing the foregoing vouchers—among our most detailed—on punched cards, only one more comprehensive step remained before all detail for a month's operations would be recorded and checked on tabulating cards. That step was the punching and checking of the month's regular journal vouchers, so we next set up a procedure to accomplish it. Under this procedure, the punched card processing of regular journal vouchers was arranged to start as soon after the end of the month as possible without being considered complete before an o.k. was received from mill offices and local accountants.

Total-Posted General Ledger

It will be apparent that the result of the foregoing procedures was to give us our monthly closing data as three journal vouchers in the form of tabulating equipment listings of the underlying punched cards. In point of fact, account totals from the cash voucher listing and the intercompany transaction listing were included in the "regular" journal voucher detail listing so that all amounts for entry in the general ledger posting might be in one place. Then we had one more run, the general ledger run. This was only an accumulation by major classifications of accounts, printing totals only of the journal voucher listed run. After the general

EXHIBIT 1

NOTE: Figures are hypothetical.

ledger was posted from this source on the bookkeeping machine, the operator would proceed to take off a profit and loss statement and balance sheet for the use of the chief accountant in the preparation of the consolidated statements of the company.

We felt we had taken steps in the right direction. All the detailed information was available but the methods were a bit cumbersome. There were too many subsidiary ledgers to refer to in order to follow just one item of cash back to its original voucher. Also confusion reigned when public accountants, internal auditors, and staff accountants all attempted to analyze accounts of the ledger at the same time. So we pushed forward towards the detail-posted ledger. Nevertheless, we feel that the total-posted ledger described did serve its purpose in more than one respect during the period of its installation and use. It doubly prepared us for the job ahead from an experience angle and, above all, made the final step to a complete, automatically-posted general ledger a *comparatively* short one.

Detail-Posted General Ledger

We need only go back to the point at which all detail covering the month's transactions is on punched cards before, however, preparation of journal voucher runs under the procedure which has been set forth. Under the new procedure, heading cards, pattern name cards, and balance forward cards have to be prepared in advance if the account detail is susceptible of summarization in ledger form. By heading cards is meant cards for major account classifications such as noncurrent receivables, prepaid expense, etc. Pattern name cards are for individual accounts under a major classification and include prepaid insurance, prepaid rents, etc., (falling under the heading of prepaid expense). Balance forward cards are the cumulative amounts for each account carried forward from the previous month's ledger. These additional cards, when prepared, are collated with the detail cards so that the latter fall behind their respective name and balance forward cards.

Before the ledger is ready to run, there is one more entry to go on the books. It is the income tax accrual. All of our profit and loss accounts are in a single series designated as "300" accounts, so we merely take their net total to arrive at a profit before taxes. This total is turned over to the tax department which gives us the tax accrual figure to set up. In a short time, the entry is made up, punched, checked, and added to our other detail cards.

MINNESOTA AND ONTARIO PAPER COMPANY

GENERAL LEDGER

PROFIT AND LOSS STATEMENT RUN — MONTH OF DEC. 1948

Name	Month Total	Balance
Gross Sales	2,796,382.08* CR	33,273,746.00* CR
Less Cash Discounts	8,955.54	86,796.45
Allowances	14,416.22	17,742.06
	2,773,010.32* CR	33,169,207.49* CR
Less Freight	181,118.97	2,308,436.62
	181,118.97*	2,308,436.62*
Cost of Sales		
Inv. Cost Incl. Burden	2,282,001.45	26,764,377.55
Whse Shipping Duty	27,291.62	291,093.58
Inventory Adjustments	53,733.86 CR	49,624.46* CR
Unabsorbed Charges	46,383.79	187,732.93
	2,301,943.00*	27,193,579.60*
Selling Expense	20,545.91	211,160.16
	20,545.91*	211,160.16*
Administrative General	145,803.25	1,486,926.14
	145,803.25*	1,486,926.14*
Other Income		
Non Operating	505,210.57	1,539,289.68 CR
Misc. Credits	570.40 CR	123,202.48 CR
	504,640.17*	1,662,492.16* CR
Other Deductions	668.88	668.88
Shut Down Expense	12,153.31	12,152.07
Int. on Notes Acct. Pay	19,469.41	63,035.55
Misc. Debits	1,616.50	14,871.22
Termination Compensation	33,908.10*	90,727.72*
Inter Company	91.71	1,100.00
Rentals	45,833.34 CR	550,000.00 CR
Int. on Bonds Pledged	89,976.54	821,589.52
Inter. Co. Income Domestic	44,234.91*	272,689.52*
Interest Etc. Funded Debt	6,338.23	77,621.86
Interest on Funded Debt	127.88	1,850.69
Amortization Bond Exp.	6,466.11*	79,472.55*
	7,265.99	66,452.84
G. L. Sale Retir. Cap. Assets	7,265.99*	66,452.84*
	145,000.00	2,570,000.00
Provision for Income Tax	145,000.00*	2,570,000.00*
	617,250.31	552,254.50
	617,250.31*	552,254.50* CR

NOTES:

Figures are hypothetical.

Unused columns of run sheet omitted—complete form appears in Exhibit 1.

EXHIBIT 2

The general ledger is now ready to run in the form of a detail tabulated listing of all entries and balances, one section of which is shown in Exhibit 1. We estimate that the run takes two and one half hours of sorting time and about two and one half hours of tabulating time. Volume is approximately 6,000 cards monthly including detail and name cards.

Financial Statements

Immediately upon completion of the general ledger, we begin to prepare the profit and loss statement and the balance sheet. All "300" accounts are separated from the rest of the cards and preparations are made to run the profit and loss statement first. These detail cards plus the previous month's summary cards plus what we call the profit and loss code cards are placed in one group, with code cards first, and then sorted by account and by profit and loss code. Inasmuch as we want this profit and loss statement to look, when completed, like a conventional statement with the usual terminology, we have to set up name cards corresponding with profit and loss statement captions.

These name cards carry a prearranged code on which we sort after the sort by account, and on which the control is based while tabulating. Without this method there would be no way of getting the profit and loss statement into a condensed form and still have our totals where we want them. The completed statement carries the current month's figures in the first column and cumulative figures to date in the second column. Totals on the bottom reflect net profit after taxes for the current month and cumulative to date for the year. To sort for and to tabulate the profit and loss statement takes approximately two and one-half hours. It results in a statement like that in Exhibit 2.

The balance sheet is handled as soon as the profit and loss statement is complete. Before the balance sheet can be run, however, we must get the current month's profit into the surplus account in order to balance. This is done by punching one card and adding it to the asset and liability cards to be used for the balance sheet. All asset and liability account summary cards produced when running the general ledger are put together, with name cards first, and sorted by account. The balance sheet is then tabulated by major account classifications with one sheet for assets and one sheet for liabilities. Approximately three-quarters of an hour is spent sorting and tabulating for the balance sheet. Exhibit 3,

MINNESOTA AND ONTARIO PAPER COMPANY

GENERAL LEDGER

BALANCE SHEET RUN — MONTH OF DEC. 1948

	Name		Balance	
	Current Assets	*	*	
		*	*	
100	Cash and Time Deposits		2,548,392.60	
101	Marketable Securities		55,000.00	
102	Notes Receivable Less Res.			
103	Accts Rec. Cost Less Res		3,364,132.45	
104	Paper Inventories		32,228.94	
105	Insulite Inventories		98,868.09	
107	Forest Prod. Inventories		2,506,675.70	
108	Operating Supplies		2,201,292.23	
	Current Liabilities	*	*	
		*	*	
200	Notes Payable Banks			
202	Accounts Payable Trade		868,877.61	CR
203	Payrolls Payable		585,571.89	CR
204	Accrued Taxes		4,187,405.39	CR
205	Accd Int. on Funded Debt		6,338.23	CR
211	Accts Pay. Sub. Cos.		2,405,261.47	CR
213	Other Current Liabilities		859,645.98	CR
		*	8,913,100.57*	CR

NOTES:

Figures used are hypothetical.

Unused columns of run sheet omitted—complete form appears in Exhibit 1.

EXHIBIT 3

although it does not show the balance sheet in its entirety, is illustrative of the results.

Easier Reference to Accounts; Faster Closings

There are many advantages which we have realized since this method of posting and maintaining the general ledger was adopted. Some of these will be brought out. First, the ledger itself lends itself to ready analysis of any account because the original source of the entries is posted directly to it, as is apparent in the cash voucher and journal voucher references in Exhibit 1. There are no total postings from the books of original entry. The vendor's name which appears opposite any cash voucher entry may be noted. With this information, an individual analyzing an account can go directly from the ledger to the alphabetical file of cash

vouchers for any additional information. Apart from the ledger setup here described, we prepare the cash voucher distribution on the punched cards for use in sales cost analysis by territories, an operation which would be impractical by manual distribution. Therefore, by using these cards for general ledger purposes, a very valuable additional use is found for cards already prepared.

A second advantage is facilitated reference to any desired account or accounts. The whole (and detailed) activity of an account for an entire period or several periods is made readily available. The machine listing sheets which comprise the general ledger under the punched card procedure are filed by account by month. As has been noted, these show the balance carried forward from the previous month, current month detail of debits and credits with voucher references, current month net change in the account, and a new ending balance. As we progress through the year, each account in the ledger lends itself to ready analysis due to this filing technique.

There is also a third important factor. The emphasis in recent years on the speeding up of month end figures is well known. We estimate that at least a day and a half and perhaps two days are saved by our method, due mainly to the fact that most of the manual effort has been eliminated from the closing. Shortening of time which elapses after the close of a month and before the figures are in statement form, is well worth putting forth effort to achieve. An automatically posted general ledger is one way of helping.

PUTTING THE FACTORY LEDGER ON PUNCHED CARDS

by CLARENCE J. NELSON, Assistant Controller,
New Holland Machine Division, The Sperry Corp.,
New Holland, Pa.

With its factory ledger expanded into an "operating ledger" through inclusion of all accounts and entries necessary to reflect gross profit, the company which serves as background for this article developed complete punched card procedures, as described, for this section of its accounting work. The resulting system has now had the test of some two and and one half years' actual use. The author recites the principal advantages realized—including use of the punched cards for budget reports—and also sets forth the company's principal reasons for retaining a manually-posted general ledger.

THE use of the punched card principle and mechanical tabulating equipment has invaded most accounting offices of medium and large companies, as well as some of the smaller ones. Operations which require handling of a large volume of detailed information, particularly if the same information can be used for more than one purpose, have been found to be handled most expeditiously and economically by the adaptation of mechanical sorting, calculating, and listing methods.

Most companies use their tabulating equipment for the accumulation of the masses of operating detail. Schedules prepared by mechanical accounting methods are analyzed by the accounting staff, totals are transcribed on journal entries and the information ultimately finds its way into the books of account. The desire for detailed cost information at a minimum cost of acquisition and the demands of modern budgeting were responsible for the development of the tabulated "operating ledger" described in subsequent paragraphs.

In order to gain maximum benefit from mechanical processes, sales, cost of sales, variance, and inventory accounts are included in this ledger (these accounts are, of course, closed back to the general ledger) in addition to the usual departmental expense accounts. It was due to the inclusion of these additional sections that the operating ledger designation seemed an appropriate substitute for the former designation of factory ledger.

Our Experience in Brief

The New Holland Machine Division of The Sperry Corporation discarded the hand-posted factory ledger on January 1, 1947, and has found that the change has paid off in the following benefits:

1. Fast, efficient monthly closings.
2. Minimizing of lost time due to clerical errors.
3. Perfect legibility of records, including folio references.
4. Better distribution of the work load at the time of the monthly closing.
5. Means of preparing departmental budget reports quickly.
6. Means of analyzing cost of sales by subaccount.

Use of Specially Designed Journal Voucher

The backbone of the New Holland system is a specially designed journal voucher form providing four columns: the usual debit and credit columns for items to be posted in the general ledger and two additional columns for factory ledger items. This journal voucher form is illustrated in Exhibit 1. Tabulations of source data are summarized each month on the standard journal vouchers so that all source information for posting to the ledgers is provided in one standard form. The entries are later bound into a folder for easy reference during subsequent periods. As soon as all journal vouchers are completed by the responsible members of the accounting staff and have received proper approval for entry in the books of the company, the general ledger postings are made manually and the vouchers released to the tabulating department for preparation of the operating ledger.

Punching and Listing of Journal Entries

Key punch operators prepare a card for each item appearing in the operating ledger columns of the journal vouchers. The information punched into the cards includes the date of entry, voucher number, the account number to which the item is to be posted, and the amount of debit or credit. The voucher symbol "JV" is punched by using the numerical equivalent. The punching is verified on the verifying punch and the cards are then passed to the tabulating machine operator who mechanically adds them to make certain that a zero balance results. In this way there is complete assurance that the ledger will be in balance after posting.

JOURNAL VOUCHER
PLANT PAYROLL

PERIOD ENDING December 31, 1948
DATE SCHEDULED Jan. 5, 1949
DATE COMPLETED Jan. 5, 1949
JOURNAL VOUCHER NO. 3

ACCOUNT NO.		ACCOUNT	GENERAL LEDGER DEBIT		GENERAL LEDGER CREDIT		✓	OPERATING LEDGER DEBIT		OPERATING LEDGER CREDIT		✓
		PRE-PROCESSING DEPARTMENT										
94	201	Allowances						12	62			
95	202	Apprentice training						121	46			
95	209	Instructional services						10	43			
95	214	Overtime premium						86	75			
95	223	Material handling						112	19			
95	229	Repair of jigs						52	14			
95	251	Rework labor						13	12			
		PROCESSING DEPARTMENT										
95	201	Allowances						94	10			
95	202	Apprentice training						4	16			
95	205	Clerks, factory						226	49			
95	207	Foreman and supervision						114	13			
		POST-PROCESSING DEPARTMENT										
96	205	Clerks, factory						26	42			
96	214	Overtime premium						35	97			
96	226	Nite time lunch period						8	43			
96	256	Repairs to machinery						26	17			
	2212	Accrued salaries and wages			12,145	06						
	0900	Operating ledger control	12,145	06								
	1201	General ledger control								12,145	06	
		TOTAL	12,145	06	12,145	06		12,145	06	12,145	06	

REMARKS To record plant payroll for the month.
(Entries shown are illustrative of labor distribution over all departments and sub-accounts. Postings to Department 95 can be traced to other exhibits)

CORRECT	APPROVED	ENTERED GENERAL LEDGER	ENTERED OPERATING LEDGER
C.W.B.	C.J.N.	J. R.	J.L.

EXHIBIT 1

OPERATING LEDGER

PROCESSING DEPT

New Holland Machine Division
OF THE SPERRY CORPORATION

PERIOD ENDED 12 31 1948

DATE MO.	DAY	Y.	ACCOUNT NUMBER	POSTING REFERENCE	DEBIT MONTH	DEBIT TOTAL	CREDIT MONTH	CREDIT TOTAL	BALANCE	✓	CK.
12	31	8	95043	JV 12	24944						
						24944			24944	●	
12	31	8	95046	JV 14	78791						
12	31	8	95046	JV 15	24322						
12	31	8	95046	VR	60000						
12	31	8	95046	VR	12573						
						175686			175686	●	
12	31	8	95056	JV 35	6000						
12	31	8	95056	JV 99	690						
						6690			6690	●	
12	31	8	95074	JV 25	10000						
12	31	8	95074	JV 40	230						
						10230			10230	●	
12	31	8	95077	JV 40	540						
12	31	8	95077	JV 55	476						
12	31	8	95077	JV 99	24613						
12	31	8	95077	VR	45434						
						71063			71063	●	
12	31	8	95080	JV 3	9840						
						9840			9840	●	
12	31	8	95083	JV 8			5415				
12	31	8	95083	JV 12	70000						
						70000		5415	64585	●	
12	31	8	95093	JV 99	123280						
12	31	8	95093	JV 99	3711						
12	31	8	95093	VR	4375						
						131366			131366	●	

EXHIBIT 2

...ma... H... ...sa... ...pl... ...m... ...pr... ...fo... ...T... ...T... ...ar... ...to... ...or... ...bu... ...tr... ...cl... ...le... ...va... ...in... ...th... ...Ra... ...ge... ...fo... ...an... ...tr... ...mi... ...in... ...li... ...th... ...th... ...th... ...re... ...th... ...ve... ...ge... ...of... ...Th... ...th...

All cards are then sorted by account number and collated with master description cards bearing the names of the accounts. Header cards for the names of departments and for inventories, sales, cost of sales, and variance accounts are inserted and the completed card deck is ready for processing through the tabulating machine. Listing is performed on separate sheets for each department, with columns for date of entry, account, number, folio reference as to source of entry and amount of debit or credit. The total of debits and of credits posted to each account are separately listed as well as the net balance of the month's postings. The total of all postings to the department is recorded at the bottom of each sheet. Exhibit 2 shows a sample operating ledger sheet on which the listing described has been performed.

(Inventory balances are carried forward from month to month, but the balances of all other accounts in the operating ledger are transferred to control accounts in the general ledger before the closing is complete. At the end of any month, the operating ledger trial balance consists of the detail of current inventory values with a contra credit to general ledger control. The operating ledger control account in the general ledger, therefore, becomes the control account for inventory.)

Redistribution of Overhead Expenses

The operating ledger sheets as tabulated are forwarded to the general accounting department for preparation of the entries to effect redistribution of overhead expenses to production departments and, finally, to cost of sales and variances accounts, as well as for transferring balances in sales, cost of sales, variances, and administrative, selling, and shipping expenses to the control accounts in the general ledger.

The distribution is effected on a standard monthly worksheet listing the departments in columnar fashion horizontally across the top of the page. Each department to be redistributed is listed vertically in the order of distribution. Balances are recorded from the operating ledger sheets on the first line of the form, and then the first department is distributed in accordance with a standard redistribution journal voucher. The voucher items are posted to the worksheet and the next department to be distributed is footed. This process is repeated until all balances are transferred to the general ledger except the current inventory balances. A portion of the redistribution worksheet is illustrated by Exhibit 3.

VERIFIED DISTRIBUTION WORKSHEET

New Holland Machine Division of The Sperry Corporation

Month of December, 1948

C.V. No.	DEPARTMENT	GENERAL LEDGER CONTROL	INVENTORIES	SALES	COST OF SALES	VARIANCES	ADMINISTRATIVE EXPENSES	SERVICE DEPARTMENTS 47000 Parberize	56000 Bldg. 250	59000 Sup. Stores	67000 Testing	PRODUCING 95007 Processing	95050 Post-Proc.
Trf.	Operating ledger	$ 239 784 77	$ 196 415 19	$ 263 598 76	$ 174 011 18	$ 98 474 81	$ 7 719 68	$ 13 670 85	$ 2 932 34	$ 7 988 05	$ 17 648 77	$ 31 619 44	
60	Plant services					214 14	321 16	425 77	681 48	311 24		111 21	
61	Industrial relations					316 45	121 16	391 12	949 16	681 82		219 64	
64	Parberize						(7 856 77)				2 477 61		
65	Tool room							24 78		57 82		198 46	
66	Building no. 250							(14 513 82)	2 164 71	3 581 16	(5 041 34)	87 60	
67	Supply stores								(5 145 83)	1 011 12	2 965 27	916 42	
68	Testing									(13 256 16)	5 227 41	358 25	
51	Operating departments					63 181 17					(22 768 14)	(12 670 32)	
52	Administrative	71 806 42				(71 880 83)							
53	Variances	17 506 76				(17 506 76)							
54	Sales and Cost of Sales	(263 598 76)		263 598 76	(174 011 18)								
	WORKS	$ 239 784 77	$ 196 415 19	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	

Explanation of Entries

Trf Operating ledger totals are transferred to appropriate columns of work sheet.

60 Plant services department is distributed to service and operating departments, only a few of which are illustrated. Charge is also made to Administrative Expense.

61 Industrial relations department is distributed in same manner as Plant Services.

64 Service department 47000 "Parberize" is distributed to other service departments and producing departments. (Only one producing department is shown in the illustration)

65 Additional service departments are distributed until all service department overhead has been redistributed to producing departments.

51 Operating departments are closed into the variance accounts which were previously relieved of standard overhead amounts.

52 Administrative expenses are transferred to the General Ledger Control.

53 Variance balance is transferred to the control account in the General Ledger.

54 Sales and Cost of Sales are transferred to General Ledger Control Accounts.

Note: In actual usage, inventory and variance accounts would be broken down into additional columns. All service and producing departments were eliminated from this illustration except those which are mentioned in other exhibits.

EXHIBIT 3

After posting the initial general ledger entries, the general ledger accountant proves his work prior to receipt of the operating ledger from the tabulating department. With a total of approximately fifty producing and service departments, the work of preparing redistribution and transfer entries requires approximately four hours. As soon as this distribution is completed, the trial balance is complete and work is immediately begun on preparation of the monthly financial statements.

The redistribution entries are forwarded to the tabulating department and the postings are mechanically made, the new sheets being interleaved with those of the original tabulation. The operating ledger is now complete. Three copies are immediately distributed to separate sections of the accounting organization. Without any conflict in the use of the same record, these sections can begin at once to prepare reports and analyses based on the month's operations.

Budget Statements and Cost of Sales Analysis

Immediately upon completion of the operating ledger, the punched cards which were used are collated with the previously punched budget cards for the same item of expense. The combined current month's deck of entry and budget cards is then further collated with punched cards representing the budgeted and actual expenses for the prior months of the year. Summary cards may be used for both prior and current month if desired.

In order to have the tabulating machine list totals for the current month only, in the column calling for this data, it is necessary to have a control in the prior months' cards so that the machine reacts only to the current month's cards. This is accomplished in the New Holland system by the gang-punching of an "X" in all cards pertaining to prior months. All cards (both current and prior months') are included in compiling the year-to-date figures. A separate budgetary control statement is prepared for each department showing for the current month and the year to date: (1) budgeted expense, (2) actual expense, and (3) variance from the budgeted amount. A specimen budget statement is illustrated in Exhibit 4.

The completed budgetary control statements are submitted to budget department for study, approval, and distribution to the proper department heads. Division heads are provided with copies of statements pertaining to departments under their supervi-

BUDGETARY CONTROL STATEMENT

New Holland Machine Division of the SPERRY CORPORATION

95000 PROCESSING DEPT — PERIOD ENDED 12 31 1948

EXECUTIVE REPORT

ACCOUNT NUMBER	ACCOUNT CAPTION	CURRENT MONTH BUDGET	CURRENT MONTH ACTUAL	CURRENT MONTH VARIANCE	YEAR TO DATE BUDGET	YEAR TO DATE ACTUAL	YEAR TO DATE VARIANCE
	GENERAL EXPENSE						
95043	INS COMPENSATION	2530.00	2494.4	35.56 CR	24332.00	19013.1	5306.9 CR
95046	INSURANCE GROUP	17340.00	17564.86	22.86	195840.00	200088	6168.8
95056	OILS LUB & GASOLINE	1040.00	66.90	371.10 CR	11870.00	12687.3	817.3
95074	SMALL TOOLS	1790.0	1022.30	767.70 CR	19370.0	14191.2	5178.8 CR
95077	SUPPLIES & EXPENSE	2500.0	7106.3	4606.3	50080.0	37676.7	12403.3 CR
95080	SURFACING SUPPLIES	1270.0	98.40	1286.0 CR	16770.0	11440.0	5330.0 CR
95083	TAXES PAYROLL	7370.0	6458.5	911.5 CR	91750.0	57629.1	13920.9 CR
95093	REP MAT MACHINERY	19490.0	13156.6	6334 CR	268090.0	225626.3	42463.7 CR
	TOTAL GENERAL EXPENSE	53330.0	49444.4	3889.6 CR	660090.0	582472.5	77617.5 CR
	INDIRECT LABOR						
95201	ALLOWANCES	1290.0	94.10	1490 CR	12390.0	1845.49	6044.9
95202	APPRENTICE TRAINING	23300.0	20041.6	3258.4 CR	236500.0	206959	29541 CR
95205	CLERKS FACTORY	2220.0	2226.49	4.49	26180.0	23798.9	2321.1 CR
95207	FOREMAN & SUPERVIS	31140.0	26670.77	4469.23 CR	377280.0	352904.6	7562.6 CR
95209	INSTRUCT SERVICES	600.0	37.36	226.64 CR	9530.0	6722.21	2807.9 CR
95214	OVERTIME PREMIUM PAY	40300.0	36442.65	3857.35 CR	453470.0	427390.0	25631.0 CR
95223	MATERIAL HANDLING	13790.0	9809.9	3980.1 CR	156330.0	128413.3	27916.7 CR
95226	NITE TIME LUNCH PER	550.0	499.61	50.39 CR	6311.0	5836.85	474.15 CR
95227	REPLACEMENT OF JIGS	240.0	142.32	116.32	7000.0	10536.4	3536.4
95229	REPAIR OF JIGS	1530.0	1066.14	466.86 CR	8340.0	16597.7	8257.7
95251	REWORK LABOR	560.0	133.24	75.24	6170.0	18905.9	12735.9
95256	REPAIRS MACHINERY	4620.0	6336.93	1743.93	130430.0	84906.5	75523.5 CR
95259	REPAIRS OTHER	13460.0	15254.54	1794.54	73460.0	169746.5	96286.5
	TOTAL INDIRECT LABOR	138570.0	126984.0	11586.0 CR	1247280.0	1307890.2	60610.2
	DIRECT DEPT EXPENSE	191900.0	176442.4	15475.6 CR	1907370.0	1890362.7	17007.3 CR
	REDIST EXPENSE						
95047	PARKERIZE	24140.0	24796.1	656.1	161110.0	173225.4	12115.4
95056	BUILDING NO 250	48990.0	50411.5	1421.5	609660.0	470884.2	161322.2
95063	SUPPLY STORES	48100.0	29564.57	18535.43 CR	537570.0	494662.7	42907.3 CR
95067	TESTING DEPT	73930.0	63777.41	10152.59 CR	859700.0	790564	61136 CR
	TOTAL REDIST EXPENSE	195160.0	167809.4	27350.6 CR	2168120.0	1929336.3	69243.7
	GRAND TOTAL EXPENSE	387060.0	244228.8	142832.2 CR	4075490.0	4127731.4	52241.4

EXHIBIT 4

sion and a copy of all statements is provided to the general manager at the same time that the major financial statements are released to the officers of the company.

Having performed the two major functions of preparing the operating ledger and the budget reports, the cards are again resorted—this time by expense subaccounts. Mechanical equipment quickly lists and totals all items posted to each subaccount for the month and for the year to date, providing a complete breakdown of purchases, direct labor, and each expense classification. These tabulations are used for comparison with the master budget.

Disposition of Punched Cards

The punched cards, having performed their basic functions, are placed in the files but remain in constant readiness for further use in special analyses or reports as required. Even though they may never be used again, they have more than justified their existence. They have accurately handled 95% of the total postings, have saved much manual effort, and have made accuracy an automatic condition. Since installation of the system, there have been no lengthy searches for trial balance errors.

Retention of Manually Entered General Ledger

Although using the punched card method of posting for the operating ledger, the division has found it to be most practical to prepare the general ledger manually for the following reasons:

1. The information is used principally for only one purpose and, therefore, the advantage of multiple use of punched cards does not accrue.
2. The volume of posting is not sufficiently large to effect any saving by using mechanical methods.
3. Due to small volume of postings to the general ledger, accuracy is not a problem.
4. Confidential figures are restricted to a fewer number of persons in the manual operation.
5. Manual posting of the general ledger aids better distribution of the work load at the time of the month when every moment counts.

Punched Card Procedure Adaptations Often Effective

Some adaptations of mechanical accounting methods have proven successful in certain offices and impractical in others due to varying internal procedures and the eventual uses to be made of the information compiled. Punched cards are not a cure-all for accounting problems, but it is probable that many accounting departments are overlooking adaptations of mechanical equipment which can be used to great advantage. Perhaps the application described in this paper is one of these.

COMING ARTICLES

In the *N. A. C. A. Bulletin*, October 1949

A Standard Pricing Base to Promote Corrective Action in Product Pricing Policies
by Allen H. Ottman

The Philosophy of Conversion Cost Pricing
by Fred L. Heath

Pricing Products to Yield Planned Return on Plant and Working Capital Investments
by Robert Beyer

Three Pillars of Price: Cost, Theoretical Market, and Market Position
by Norman H. Gross

Production Planning and Inventory Control for Market Maintenance and Penetration
by Dan H. Barr

Leaves from the Salesman's Order Book—A Simplified Order and Billing Routine
by Wayne R. Archerd

The Procedural Requirements of Field Warehousing
by Peter C. Jung

Application of Standard Costs to Textile Finishing Operations
by George C. Lyon

ACCOUNTS MAINTAINED FOR A COMPANY-OPERATED IN-PLANT FOOD SERVICE

by KENNETH C. PIPPERT,
Plant Controller, J. I. Case Co.,
Rock Island, Ill.

The relative simplicity with which the accounts needed for a company owned and maintained cafeteria were worked into the ledger setup, is presented in this article in which the author also comments on some of the considerations involved in undertaking to provide in-plant food service. A form of operating statement to disclose the financial results of the project is included.

OUR plant is in the farm equipment manufacturing business and employs approximately two thousand persons. It is located about one mile from the business district in a city with a population of 50,000. From 1942 to 1949, we passed from a period of no food service to our present stage of a company-owned, operated, and managed cafeteria. The various stages in this development were: (1) period of no food service, (2) coffee and sandwich period with food prepared outside by a catering service, (3) period when the company furnished fixtures and equipment only, and (4) present period of company ownership of all facilities.

The food service is organized as a separate department and all employees are on the company salary payroll, including the department manager who is held responsible for results as is the case in all production and service departments.

Incorporating Food Service Accounts in the General Ledger

To avoid the necessity of maintaining a separate ledger and to attain the benefits of unified accounting system, our food service accounts are included with our general ledger accounts. Very few additional accounts proved necessary with the result that the general ledger was not burdened by detail. However, five special accounts are maintained, with extra accounts also for such subdivisions of provisions and supplies as may be desired.

1. *Provisions and Commissary Supplies*—These accounts are debited with the cost of all groceries and meats necessary for use in preparation of meals and for all commissary

supplies such as cigars, candy, etc. The offsetting credit is to vouchers payable. Foods are purchased in advance and stored until needed. When foods are taken from the stores, they are not requisitioned. Instead, a physical inventory is taken at the close of each month's business. This inventory is then priced by the accounting department. The difference between previous inventory plus purchases and the physical inventory is considered the cost of food sold and is credited to the material accounts and debited to food service profit and loss.

2. *Salaries*—This account is debited with the salaries of all food service department employees, including the manager. Transfer to food service profit and loss is made monthly.

3. *Expenses*—This account is debited with all expenses, such as gas, repairs to equipment, and cost of labor expended by factory personnel for the upkeep of the food service facilities. At the close of each month the balance in this account is transferred to food service profit and loss.

4. *Food Service Receipts*—This account is credited for the cash received from food and commissary supply sales. All employees handling cash are bonded. The balance in this account is likewise credited to food service profit and loss at the close of each month.

5. *Food Service Profit and Loss*—This account is debited each month with the cost of food sold, salaries, and general expenses. It is credited with the cash receipts. The account is carried in the general ledger as a component of the general factory overhead account, a debit balance reflecting a food service deficit and a credit reflecting a profit from operations.

Entries Required to Reflect Food Service Operations

The set of four principal journal entries which follow may help to make the procedure concrete. A simple situation is assumed although minor complications may arise in practice. The entry to record the monthly purchases of meats, groceries, and commissary supplies makes its actual appearance in the distribution summary of the factory voucher register. Its theoretical form is as shown below:

	Dr.	*Cr.*
Provisions	xx	
Commissary Supplies	xx	
Vouchers Payable		xx

To set up cafeteria purchases for the month.

To adjust book balance of provisions and commissary supplies to physical inventories at the close of each month and to transfer the cost of food sales so determined to the profit and loss, the following entry is made:

	Dr.	*Cr.*
Food Service Profit and Loss.....	xx	
Provisions		xx
Commissary Supplies		xx

To reflect consumption of provisions and commissary supplies.

The remaining two entries close out to profit and loss food service salaries account (charged from the payroll) and food service sales (credited from cash receipts). The entries are shown below without journalization:

Food Service Profit and Loss.....	xx	
Salaries		xx
Expenses		xx
Food Service Sales.....	xx	
Food Service Profit and Loss.....		xx

Food Service Operating Statement

No attempt is made to prepare a special balance sheet. Food service assets are included in with regular company assets on its balance sheet. Cash on hand in the food service is included with company cash on hand. It is the policy to pay food bills promptly and liabilities at the close of the month are negligible. Since all food sales are on a cash basis, no accounts receivable are involved.

The *profit and loss statement* is the only food service statement prepared monthly for management. Our general objective in the day-to-day operation of the service is to keep food prices as low as possible without incurring more than a limited deficit. Hence figures of greatest interest are total sales and costs for each month. The profit and loss statement summarizing the income and expenses for a month is illustrated in Exhibit 1. This statement is drawn up in a form that is intended to bring out the important facts in connection with the financial results of operations.

Nearly all managements undertaking in-plant feeding as a promoter of good employee relations, subsidize operations to some extent. In one instance this cost amounted to $9.79 per year per

FOOD SERVICE OPERATING STATEMENT

	Month	*Year to date*	*Percentage to sales*
SALES	$	$	
COST OF GOODS SOLD:			
Inventory, beginning of period	$	$	
Purchases			
	$	$	
Less: Inventory at close of period			
	$	$	
Gross margin	$	$	
OTHER INCOME			
Canteen machines			
	$	$	
GENERAL EXPENSES:			
Salaries	$	$	
Miscellaneous expense			
	$	$	
NET RESULTS FROM OPERATIONS	$	$	

EXHIBIT 1

worker. This cost, along with numerous other costs such as group insurance, hospital expense, recreation activities, paid vacations, etc., has become an important part of labor costs within the last fifteen years.

Maintaining High Standards for Food Service

The selection of standards of operation are just as necessary for a successful food service department as for the production departments. It seems to us that company management and ownership of the most modern equipment are essentials and that knowledge of costs of operation and a sound system of food control are also necessary. There is also the "must" of good food and good service.

The company-operated in-plant food service accounts can easily be integrated with the regular accounts without making it necessary to hire additional accounting department personnel. Management of an industrial food service can be an excellent training ground for junior executives. Here they secure experience in supervising the maintenance of buildings and equipment, hiring needed workers, assisting in planning menus and setting prices and preparing sales tax reports, and handling other business which turns up in connection with the project.

MEETING MANAGEMENT COST PROBLEMS FOR A PUBLISHER OF CLASSROOM PERIODICALS

by JOHN E. SHIRLEY, Partner,
Arnold, Hawk, & Cuthbertson,
Dayton, Ohio.

The periodical publishing business is one which has characteristic cost problems. These are described by the author of this article as they apply to a company publishing a number of magazines on a classroom subscription basis and mailing them in bulk. The paper devotes the major portion of its space to the solution of such of these problems as relate to the supplying of cost data to management for pricing, control, new venture, and other purposes.

MORE than one half dozen magazines are published and mailed to the subscribers weekly (one biweekly) by the concern whose accounting methods are to be described in this paper. A complete editorial staff is maintained but all mechanical operations, such as typesetting, engraving, printing, etc., are subcontracted. Some mailing is also done outside. The magazines are mailed during the school year on a semester basis. The subscribers are teachers who order for their own and others' classroom pupils. Thus the operation is seasonal and involves bulk mailing. These periodicals comprise more than 95 per cent of the volume. In addition, a line of booklets, school pupil work books, and similar merchandise is edited, published, and sold on a single mailing order basis. A small amount of advertising space is sold.

Absence of Interim Financial Statements and Cost Estimates

For a number of years no accounting for costs was made by the publisher and it was possible to obtain operating and financial statements only once a year. Cost estimates on existing publications were made under great difficulty and there was an understandable reluctance on the part of management to place much reliance on these estimates for pricing and distribution policy decisions. Cost estimates on proposed or contemplated new publications were regarded as even more hazardous for decisions and break-even point information was not available.

For the above and other reasons, the management requested that the accounting system be revised so that accurate periodic

costs of individual publications could be provided for: (1) pricing and distribution policies, (2) study and control, (3) estimating contemplated new publications, (4) reliable operating statements, and (5) a basis for establishing break-even point information.

A Program to Provide Periodic Costs by Publications

In addition to the bulk mailing feature, the mailing of the company's publications follows the normal grade-school year and the two semesters making up that year. As a result, the operation differs from the continuing and year-lapping subscription situation of other periodical publishers who are also usually on a single-copy-for-each-subscriber basis. It follows that the accounting for this operation differs in many respects from that suitable to other publishing operations. Another characteristic circumstance of the operation is that at the start of each school year the subscription volume runs through a trial period and an acknowledgement-of-order period which carry beyond the halfway mark of the first semester. The same thing occurs again to a much lesser extent for and into the second semester.

It is for these reasons that, to date, it has not proven practical to offer costs and operating and financial statements other than by way of estimate until at the first semester end (which practically coincides with the semiannual mark of the fiscal year), the third quarter mark, and the fiscal year end. However, with the continued operation of the present accounting system, it will be possible and desirable (at the option of the management) to compile accurate publication costs and reliable financial and operating statements monthly after the end of the first quarter.

As a first move toward the development of cost information, a program was set up with the objective of determining management's needs in this respect. Such a program was carried out as indicated by the following statement of completed steps:

1. Determined what was wanted by the management in the way of costs and related reports.
2. Determined the extent of details desired by management.
3. Established the form and content of cost reports.
4. Surveyed conditions and made studies to determine the simplest ways to obtain the necessary information.
5. Surveyed conditions and made studies to determine the simplest ways to compile the necessary information.
6. Worked out the details.

As to the first point above, it was determined that the management wanted the following:

1. Publishing costs by publications per thousand printed copies.
2. Publishing costs, distribution costs, advertising and promotion costs, records and administration costs, and total costs by publication per thousand paid circulation.
3. Determination of and reporting for the cost of free circulation by publications.
4. Operating and financial statements for the first six months, the third quarter, and the fiscal year—to be expanded to monthly intervals when practical and if desired.
5. Break-even point information per thousand paid circulation on each major publication and on all of them.

Account Structure

A new chart of accounts was constructed, making allowances for the proper inventory accounts, deferred costs, and deferred income as pertains to the balance sheet, elements hitherto not adequately treated. Separate sales accounts were set up for each publication and each of the accounts of the cost of sales section (publishing cost) was considered individually for the effect of volume, i.e., whether variable, fixed, or semifixed. The accounts were so classified in the chart of accounts. The same treatment was accorded the accounts for distribution, advertising and promotion, and those for records and administration.

Bases of Allocating Costs to Publications

A number of cost of sales and expense items such as paper, printing, typesetting, editorial salaries, etc., can be distributed directly to the publications concerned. Some are a combination of direct and indirect charges to publications. However, other costs—such as editorial books, other subscriptions purchased, and fixed charges have to be distributed by formulae. These conditions also apply to advertising and promotion expenses. The subscriber accounts, maintenance costs, and general and administrative expense items all have to be distributed by formulae.

Because of the wide variation in the nature of the amounts charged to each of many of the cost of sales and expense accounts to be distributed to publications, it is impossible to set overhead rates based on current conditions which can be applied equitably

on a common basis for all publications. Therefore, several distribution bases are determined for application to all of the accounts affected. An illustration may serve to clarify the necessity for this point. Many accounts, such as for wrappers and labels used in mailing publications, have amounts charged to them representing a variety of combinations of publications. One charge may be for "A" and "B" publications, another for "B," "C," and "D," still another for "A," "C," and "E," etc.

Under these circumstances, the methods by which costs are to be taken into the costs of a particular publication must be kept clearly in mind and consistently applied. The methods applied in this operation may be enumerated as follows:

1. Direct charge basis.
2. Paid circulation bases (numerous).
3. Payroll distribution basis.
4. Floor space basis.
5. Number of publications basis.
6. Number of entries to subscribers' accounts basis.
7. Method (1) combined with one or more of the others.

Item 2 designates bases which are as numerous as the number of combinations resulting from the number of publications published. The determination of these bases and their applications are not nearly as complicated as it might seem from this quick reference to them. Basis 1 is taken directly from the voucher. The numerous combinations under Basis 2 are determined from statistical data provided by the subscribers' accounts department's statistical section, as is also Basis 6. The computations called for by the other bases listed are apparent from the items themselves.

A tabulation of distribution bases used for particular account classifications may prove helpful. This is afforded by Exhibit 1.

Voucher Coding for Cost Allocation

Each cash voucher or journal voucher account charges affecting cost of sales or expenses is keyed with a distribution basis alphabetical or numerical code. The direct charges are coded alphabetically and the indirect charges are coded numerically. The voucher amounts and breakdowns for the accounts find their way to the expense ledger in total through regular entry and posting procedure. For costing, a distribution card is made for *each* distribution basis amount involved in each voucher. The card shows voucher date, voucher number, account number, distribution basis

FUNCTIONAL COSTS AND ALLOCATION BASES

Item	*Chargeable directly*	*Partly direct and partly by formulae*	*Chargeable by formulae*
Publishing costs	Printing Paper Freight in	Editorial salaries and wages (1) Manuscripts (1) Cuts, mats, and plates (1) Photos and news service (1) Art work (1) Paper storage (1) Typesetting (1)	Editorial books and pamphlets (2) Editorial subscriptions (2) Depreciation on editorial furniture and fixtures (2) Rent on editorial quarters (2)
Distribution costs	Second class postage Mailing wages Mailing service	Wrappers and labels (3)	Supervision (3) First class postage (3) Addressograph supplies (3) Repairs and maintenance (3) Supplies and fixed charges (3)
Advertising and promotion	Agency commissions Sample, gratis, and overprinted copies Postage on samples Youth group fees and expenses	Advertising portion of editorial salaries (4) Wages—mailing, direct mail advertising, samples, and premium binders (4) Salesmen's salaries (4) Advertising space—other publications (4) Advertising and promotion traveling (4) Direct mail advertising cost (paper and printing) (4) Cuts, photos, and art work. (Advertising portion) (4)	Wages in respect of mailing exhibits (4)
Records and Administration (General and administrative expenses and maintenance of subscribers' accounts)			All (5)

Notes:

(1) Portion not directly chargeable allocated by formulae based on the print orders involving more than one publication.

(2) Distributed to publications in proportion to direct charges contained in editorial salaries and wage accounts for the several publications.

(3) Allocated among publications in proportion to direct charges for wages paid for the mailing operation.

(4) Charged to individual publications on the basis of current paid circulation formulae of all combinations of publications.

(5) Taken to publications costs on the basis of the number of entries (except payments) to subscribers accounts for a specified period.

EXHIBIT 1

code, and amount. An entry amount for a single account often has several distribution bases. These distribution cards are totaled and balanced, after each batch has been made, to totals of the cash vouchers and journal vouchers affected and are filed by account number and distribution code by date sequence.

It should be mentioned that salary and wage distributions are obtained through standard timekeeping procedures. Paper costs are determined by perpetual inventory records on a "fifo" basis. Manuscripts, art work, and photo costs are the result of an item by item perpetual inventory set up and all other items of the nature of mailing supplies, office supplies, editorial supplies, etc., are on a perpetual inventory or measured usage basis, depending upon their dollar usage importance.

At the end of the first semester under present procedure—after all cost-adjusting entries are on the books and after all of the distribution cards are made, balanced, and filed—a trial balance of the general ledger is taken on thirteen-column work paper. The distribution cards are sorted by account number order by distribution basis. Account totals are tabulated for proof to the cost of sales and expense accounts in the trial balance. After this proof is established, the distribution cards are re-sorted to distribution basis code in account number order and tabulated into totals by (1) distribution basis by (2) account number. Finally, a grand total proof is run.

The direct charges to publications in the cost of sales and expense categories are now ready to be entered by account number and description directly in the direct charges column of the publication cost summary sheets later described in more particular. The indirect charges to publications in the cost of sales and expense categories are also ready for entry on intermediate cost distribution sheets, now to be dealt with, for calculation of amounts to be carried to the cost summary sheets.

Working the Allocations—The Cost Distribution Sheets

The Cost Distribution Sheet, illustrated by Exhibit 2, is utilized separately for each distribution basis to allocate the amounts for the cost and expense accounts which are distributable to publications indirectly by the various formulae. Column headings are the names of the publications. The formula percentages for each distribution basis (worked out as previously indicated) are transcribed beneath the publication names.

COST DISTRIBUTION SHEET

Period _____

Account number	Description	Total 100%	Distribution (11 columns) Publication x%	Publication x%	Publication x%
	PUBLISHING COSTS				
	Variable				
	(List account numbers and names)	x			
	Total variable	x	x	x	x
	Fixed				
	(List account numbers and names)	x			
	Total fixed	x	x	x	x
	Total publishing	x	x	x	x
	DISTRIBUTION COSTS				
	Variable				
	(List account numbers and names)	x			
	Total variable	x	x	x	x
	Fixed				
	(List account numbers and names)	x			
	Total fixed	x	x	x	x
	Semifixed				
	(List account numbers and names)	x			
	Total semifixed	x	x	x	x
	Total distribution	x	x	x	x
	ADVERTISING AND PROMOTION COSTS*				
	SUBSCRIBERS' ACCOUNTS COSTS*				
	GENERAL AND ADMINISTRATIVE COSTS*				
	Total Costs				

* Detail as illustrated under distribution costs.

EXHIBIT 2

The amounts for costs and expenses chargeable to publications by the allocation process, are recorded from the distribution card sort totals by distribution basis and account number sequence in the total column of the form. There they are ready for distribution to the publication columns through the allocation calculations.

Each set of cost distribution sheets for each distribution basis is balanced and grand total of all are proofed to a grand total taken of the distribution card totals (those affecting indirect distribution

bases only). The amounts on the total lines of the sheets are posted to the various cost summary sheets indicated by the column headings, to which direct charges to publications have already been posted from the letter-coded distribution cards.

Costs by Publications—The Cost Summary Sheets

In order to facilitate a detailed account by account study of costs by publications, the cost summary sheet forms are printed in chart of account sequence with all account numbers and names under each cost function, i.e., publishing, distribution, etc. The grouping of accounts for each function as variable, fixed, and semifixed is maintained as in the ledger. The form is designed four sheets to a set. One set is utilized for each publication for each affected period. With account details omitted and the number of distribution columns indicated by notation, the form appears as in Exhibit 3. The letter "x" is used to indicate entry locations.

As mentioned earlier, direct charges for each publication are posted from the distribution ticket sort totals by account number to the cost summary sheets in the direct charges column. Entry is made to the nine columns for indirect allocation by the various category totals only, from the cost distribution sheets, to which number-coded amounts from the distribution cards, requiring allocation, are first taken and on which allocation is worked.

The cost summary sheet sets are the source from which the costs and expenses used on the periodical profit and loss statements by publication, are derived. The grand total of the results on all cost summary sheet sets is balanced to the total cost of sales and expenses by account totals appearing on the working trial balance.

The Problem of Samples Costing

The process of costing out samples, gratis copies, and overprinted copies is carried out in order that publishing cost averages will not bury this important item. The accounting mechanics do not require that there be any journal entries made to transfer this cost from publishing to selling expenses. It is done on the cost summary sheets in detail for each publication and on the working trial balance for the total. While it can be successfully argued that the over-printing is a publishing cost, it was decided that the overprints are occasioned because of the desire of the management to have ample copies for sale during the seasonal period of unsettled subscriptions and enough to provide generous sampling. There-

Cost Summary Sheet

Name of Publication ..... Period .....

Item No.	Description	Total	Direct charges	Indirect allocations* (9 columns)		
1.	Total printed copies	x				
2.	Paid circulation copies	x				
3.	Samples, gratis, and over-prints	x				
4.	Copies in inventory—beginning	x				
5.	Copies in inventory—ending	x				
	PUBLISHING COSTS					
	Add: Beginning inventory—Work in process	x				
	Variable					
	(List account numbers and names)		x			
	Total variable	x	x	x	x	x
	Fixed					
	(List account numbers and names)		x			
	Total fixed	x	x	x	x	x
	Total publishing costs	x	x	x	x	x
	Less: Ending inventory—Work in process	x				
6.	Net total publishing costs	x				
7.	(Unit publishing cost of printed copies = Item No. 6 ÷ Item No. 1 =)					
	Less: Samples, gratis, etc. copies (Item No. 3 x Item No. 7)	x				
	Net publishing costs	x				
	Add: Beginning inventory—Finished publications	x				
	Net					
	Less: Ending inventory—Finished publications (Item No. 5 x Item No. 7)	x				
8.	Net publishing cost of sales	x				
9.	(Publishing cost per thousand copies: Item No. 8 ÷ Item No. 2 x 1000 =)					
	DISTRIBUTION COSTS					
	Variable					
	(List account numbers and names)		x			
	Total variable	x	x	x	x	x
	Fixed					
	(List account numbers and names)		x			
	Total fixed	x	x	x	x	x
	Semifixed					
	(List account numbers and names)		x			
	Total semifixed	x	x	x	x	x
10.	Total distribution	x	x	x	x	x
11.	(Distribution cost per thousand copies: Item No. 10 ÷ Item No. 2 x 1000 =)					
	ADVERTISING AND PROMOTION COSTS**					
	SUBSCRIBERS' ACCOUNTS COSTS**					
	GENERAL AND ADMINISTRATIVE COSTS**					
18.	TOTAL COSTS	x				
19.	(Total Cost One Thousand Copies: Item No. 18 ÷ Item No. 2 x 1000 =)					

*From cost distribution sheets.
**Detail as under distribution costs.

Exhibit 3

fore, as a matter of policy, the cost is considered to be one of a selling nature.

Tools for Management

Operating and financial statements are prepared quarter-annually and semiannually each fiscal year. The six-month mark coincides almost exactly with the end of the first semester's publishing. Thereafter, because the circulation level by subscribers has stabilized to a predictable basis, it also becomes practicable to prepare monthly data. The operating and financial statements worked up for each reporting period consist of the following:

1. Balance sheet.
2. Profit and loss in total and by publication.
3. Statement of operating profit and loss in total and by publication for each 1000 paid circulation.
4. Schedule of samples, gratis and over-printed copies.
5. Break-even point charts in total and by publication for each 1000 paid circulation (these are prepared only semiannually and annually by the hyperbolic curve method).

From the cost details provided by publications on the basis of 1000 copies, the management can be provided with detailed studies of the various elements of cost on all publications. The prices called for by circulation volume and varying order sizes can be determined. Contemplated new publications can be considered in terms of the costs by operating functions which would be incurred and, when considered together with adequate market survey material, the conditions under which new magazines can be properly published, presented, and sold at a profit may be visualized.

However, it must be conceded that pricing, distribution, and cost control policies are best decided in the presence of budgeted and forecast standards. The next step contemplated by the management in amplifying the cost system is the introduction of these devices. The cost accounting system now in operation will provide an indispensable tool in the working out of this program. Costing formulae and principles have been established by experience and these will save countless hours of trial and error effort otherwise necessary in establishing budgets and forecasts. When the further expansion of the system is complete, standards together with actual performance measurements will permit the management to base all pertinent policies on the optimum combination of operating facts and considered expectations.

THE COST FORUM

Repackaging Slow Sizes of Finished Stock

Editor, N. A. C. A. Bulletin:

In these days when high costs still obtain but raw material markets are sluggish and show a tendency toward lower prices, the finished stock inventory is of utmost importance. Companies may find that they have an overstock in certain sizes of particular products while other sizes are turning over fairly regular. This is sometimes true in the paint industry which packages paint in various sizes for trade sales. To transfer these products from unsalable sizes into salable sizes creates an accounting problem.

One paint company handles this problem in the following manner. It issues what is termed a dumped stock ticket along with a filling ticket. The dumped stock ticket shows the name, catalog number, size, and number of units that are to be transferred into different sizes and the reason for the transfer. The filling ticket shows the name, catalog number, sizes, and number of units into which the material is to be transferred. Both tickets are given the same number and date and are registered by the cost department. The tickets are issued by the superintendent of the inventory control department to the warehouse department which accumulates the finished stock that is to be dumped and sends it to the filling department. The filling department does the work of dumping the material from the unsalable size containers into the salable size containers indicated on the filling ticket and adjusts the quantity on the filling ticket to the number actually filled. The material, in new size containers, is sent back to the warehouse. The dump stock ticket and filling ticket are sent to the cost department.

Cost department personnel checks the tickets to the ticket register. From the dump stock ticket the finished stock account is credited at standard cost, and the quantity of bulk gallons refilled according to the filling ticket is debited to paint work in process at standard cost. The difference plus labor in dumping is charged to expense. From the filling ticket, the paint work in process account is credited for the bulk paint realized, at standard cost. The package raw material account is credited with the new containers, cartons, and labels used at standard cost and factory expense is credited with the standard labor and overhead for the refilling. The finished stock account is debited for the quantities on the filling ticket at standard cost. This system enables the company to keep its finished stock inventory account in accordance with actual physical inventory at all times and to carry out the repackaging operation systematically.

CHARLES F. PFEFFER, *Louisville Chapter*

Centralization Is Not "Clear Sailing"

Editor, N. A. C. A. Bulletin:

Many national organizations are frequently confronted with the problem of determining whether they should maintain their records, perform certain functions, and compile desirable statistics at a central point rather than to spread the work over many locations. There are many things to be considered from both an economical as well as a practical point of view.

The considerations involved from the viewpoint of economy may be summarized as follows:

1. Can the centralization be accomplished at a reduced cost?
   a. Can the personnel at the outside locations be spared if the centralization of particular functions is effected?
   b. Can the centralized work be facilitated by the installation of automatic equipment?
2. Can the statistical reports be reduced in volume?

The considerations involved from a practical viewpoint may be summarized as follows:

1. Can the trade be properly served after the removal of the clerical operations from the various locations?
2. Does the personnel at the outside locations perform any other service? Can such service be fully discarded?
3. What would be the personnel and public relations angles?

The difficulty in effecting centralization may be multiplied many times, depending upon the factors and circumstances in individual cases. The final determination in such a program must be one of business policy because, regardless of the savings that may be effected, the business relations with the trade and with operating personnel certainly deserve great consideration. The mechanization of record-keeping has gone a long way towards reducing overhead in many businesses but it is a program that also eliminates employment.

It is desirable to be sure of the results of the change in advance. In one instance which may be cited, a national organization attempted to make its cost system standard by the use of company-wide code numbers and to centralize its accounting and statistical work. It was a borderline case from the viewpoint of economy and, in addition, the personnel became so confused with the change that it was many months before the system could be operated in the manner originally intended. Even then it became necessary to retain all personnel at the various locations because of the fact that other essential duties and services were performed. The volume factor is very important if cost reduction is contemplated and, as indicated in this illustration, proper consideration must be given to the quantity and type of work performed at each location before a program is installed.

WILLIAM F. HOERNER, *New Orleans Chapter*

Some Rules for Issuing Procedural Instructions

Editor, N. A. C. A. Bulletin:

One of the many functions of the controller's staff of our company is to develop for management procedures relating to accounting or organizational changes. It is quite important to convey the subject matter of such changes to our divisional offices in a manner that may be readily understood.

Perhaps it might be supposed that, in general, the method to be used in presenting material of this sort would not offer too great a problem. However, past experience indicates that instructions may create confusion rather than clarity and prompt lengthy letters between the general office and divisional offices if couched in terms too general to be readily applied. Considerable study was given to this problem and we found that in order to obtain the desired results, it was quite important to establish basic rules.

The first step was to set forth the requirements as to the occasion for classification, and source of instructions.

When will instructions be issued—General office instructions will be issued only in the event that the subject procedure is intended to remain in effect for an indefinite length of time. Special requirements of a short duration or notifications not construed as procedural factors must be issued in letter form.

How will instructions be identified and classified—Instructions will be given a separate series of numbers for each of the following departments (and for such subdivisions of departments as may be separately located at manufacturing units or warehouse offices or within the general office):

1. Accounting
2. Credit
3. Personnel
4. Purchasing
5. Sales
6. Miscellaneous

Sections and paragraphs of an instruction should be lettered and numbered for convenience of reference. Supplementary instructions will be issued to add to or modify certain sections or paragraphs of prior instructions and will be used in lieu of completely revised instructions. However, only two "supplementary" instructions may be issued as additions to or modifications of a previous instruction. Such a supplementary instruction will bear the same number as the original instruction, followed by the letter "A" or "B", depending upon whether it is the first or second supplement. Following issuance of the second supplement, the next addition or modification will call for issuance of a completely revised instruction bearing also the same number as the original.

The controller's department will *classify* all instructions and *assign* the proper divisional numbers. Manufacturing units, warehouse offices, and the general office will each establish a manual of instructions based on the departmental classifications.

Who may issue instructions—General office instructions may be issued by any department head but may not be released until properly approved, classified, and coded.

Who may approve instructions—Written approval must be obtained from one of the following: (1) president, (2) executive vice president and general manager, (3) vice president and general sales manager, or (4) vice president and controller.

The second step was to formulate certain rules which we concluded were essential in the writing of instructions. These rules follow:

1. Cover only one subject matter in a single instruction.
2. Prepare each instruction in outline form, using in all instances topic captions for the benefit of the reader.
3. Avoid long and involved sentences. Be concise, direct, and to the point. However, do not exclude explanations required for clarity.
4. Avoid extra detail which has no direct bearing on the subject matter of the instruction.
5. Summarize the general principles that must be observed and followed.

The adoption of these standards has proven beneficial to our divisional offices and to the general office as well.

R. J. LANCHES, *Twin Cities Chapter*

Interplant Standard Cost Comparisons

Editor, N. A. C. A. Bulletin:

Whenever a company has two or more plants manufacturing the same products, unusual opportunities exist for possible cost reductions through interplant cost comparisons. In the usual situation, the unit costs of all plants are compared and the effect of the higher plant costs is reflected in statistical tabulations or special analyses.

For several years we issued separate reports showing the effect of extending the production of each of our plants by the *local* plant cost and by the *lowest* plant cost. Effective January 1, 1949, we decided to reflect the lowest unit costs as the basis for valuing finished goods inventories and finished goods production. The difference between the local plant standard cost and the lowest standard cost of all plants, which we have designated as "U. S. A. standard cost," is reflected in a separate variance account identified as "interplant cost variance." This difference is calculated when pricing the monthly production of each item of finished goods at each plant. Work in process inventories are credited at local standard costs, finished goods are priced at "U. S. A. standard costs" and the difference is reflected in the variance account. Monthly cost of sales is determined at all plants at "U. S. A. standard costs."

There are several benefits from recording the interplant cost variance in the manner described. First, local plant costs are used for measuring local plant performances. Second, the difference between the individual plant cost and the "U. S. A. standard cost" is recorded in the accounts and clearly identified in financial statements issued to management. Third, inventories are priced at the lowest standard cost.

ERNEST A. CARLSON, *Newark Chapter*

Basic Considerations for the Capital Expenditure Forecast

Editor, N. A. C. A. Bulletin:

Every concern can profit by making a systematic study of the efficiency of its equipment and by correlating its equipment needs with a forecast of the probable range of its sales and cash requirements for at least several years ahead. Instead of spending money for whatever is thought of first, it should lay out a program and select its investments according to merit. The factors which govern the selection of new equipment to replace worn-out equipment are:

1. The potential market for the products to be produced. Frequently lack of market research prevents management from being acquainted with the sales possibilities of the articles to be manufactured.
2. Question of choice among different makes of machines.
3. Possible changes in technology and use of improved types of machines.

The responsibility for handling these matters and hence for plant and equipment expenditures is properly recognized at two levels:

1. The chief executive, on the basis of recommendations of major functional executives and subject to approval of the board of directors, should frame a long-range program for plant expansion. Expansion of existing facilities, where proposed, should be related to one of the following reasons:
    a. Increase of profits.
    b. Tie in with long-range sales forecast.
    c. Tie in with retirement of long-term indentures.
    d. Reduction of costs.
2. Minor executives should freely offer their thought-out recommendations for repairs, replacements, and additions. The replacement of existing facilities before expiration of useful life is determined largely by consideration of the following:
    a. Comparative costs of old and proposed new shipment.
        (1) Comparison must cover same time span for old and new equipment.
        (2) Maintenance and other operating cost.
        (3) Depreciation.
        (4) Net book value of old equipment.
    b. Relation of existing machine capacity to proposed equipment.

The purpose of a forecast of plant expansion extends beyond accurate preparation of it. Adherence to the forecast is essential and actual expenditures must be compared with it. The accountant should be the balance wheel when the plant and equipment budget is included in the financial budget of the company.

ALMER J. COOK, *Dayton Chapter*